

NOVA SCIENCE



UNIVERSIDADE
NOVA
DE LISBOA

2019

C O N T E N T S

NOVA
SCIENCE

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TITLE

NOVA Science

PROPERTY

Universidade Nova de Lisboa
Campus de Campolide
1099-085 Lisboa
Portugal
Tel.: +351 213 715 600
E-mail: nova.investigacao@unl.pt
www.unl.pt

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Carlota Terenas
www.thisiscart.com

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1

04

WELCOME
TO NOVA

2

06

A WORD FROM
THE RECTOR

3

08

MESSAGE FROM
THE VICE-RECTOR
FOR RESEARCH

4

10

RESEARCH

5

12

NOVA
RESERACH
PORTAL

6

14

ACADEMIC
UNITS

7

34

RESEARCH
UNITS

8

42

COLAB
COLLABORATIVE
LABORATORIES

9

62

NOVA TALENT –
ERC GRANTEES

10

94

SPEAR
PROJECT

11

96

INTERVIEWS

12

104

COLLABORATIVE
RESEARCH AWARD
SANTANDER/NOVA

13

106

NOVA
SCIENCE
DAY 2019

1

WELCOME TO NOVA

NOVA University Lisbon has Academic Units in Lisbon, Almada, Oeiras and in Carcavelos.



“ to serve society through knowledge and education on a local, regional and global level.

Founded in 1973, NOVA University Lisbon (NOVA) is a public university that has adopted since its inception an innovative multidisciplinary model in the Portuguese university context.

NOVA has been developing its activities across a broad range of areas from engineering and technology to humanities, medicine, health and life sciences, economics, social sciences, law, and information and data science, with the mission to serve society through knowledge and education on a local, regional and global level.

NOVA is a global and civic University. **Global** because its teaching and research is absolutely international in its quality, agendas and partners; and **civic**, because it is deeply committed to the development of society, culture and economy of the Greater Lisbon region, of the country, of Europe and also of the Portuguese-speaking countries to which we are connected throughout centuries of common history.

Delivering high quality teaching that assures the preference of employers and the success of graduates in the job market is a key priority for NOVA, together with the development of top-notch research that contributes to tackle major societal challenges in line with the United Nations Sustainable Development Goals.

The recognition of this quality, both in teaching and research, guarantees the presence in prestigious international rankings, and the participation in networks such as UNICA, YERUN, EUA and CESAER.

Among the 21 best European universities under 50 years old, NOVA stands out for its comprehensive nature, internationalization culture and commitment to the major challenges of society.

NOVA is the Portuguese university with the best performance in the Horizon 2020 Programme, boasting a track record of 20 ERC grants awarded to its researchers.

The university has nine academic units, more than 20.000 students and 1.800 teaching staff and researchers, and over 2.500 international students from 109 nationalities enrolled in its programmes. ■ ■

2

A WORD FROM THE RECTOR

João Sàágua

NOVA UNIVERSITY LISBON



2

SCIENCE AT NOVA: BEYOND OUR IMAGINATION

NOVA University is fully devoted to its mission to serve society through knowledge and knowledge-based innovation, and to make a difference in the pursuit of a more sustainable world.

Hence, we are very proud to say that NOVA has become a Research-oriented University and, most importantly, a university that combines fundamental Research with collaborative agendas tackling real problems and challenges posed by society, their institutions, and by the sustainable development goals. We call this combination a *general mission-oriented approach to Research* based on specific societal challenges.

We are fully committed to support talent and to act strongly on our dedication to Science. As a result, we created a special program called Talent@NOVA which includes several subprograms: the NOVA Doctoral School, the 'Preparing for my ERC Grant Application' course, and the regulations for Individual Hiring, Merit Reward, Merit Prizes, and Academic Evaluation Contemplating Different Profiles. These subprograms, we believe, will contribute to attract and retain the best research talent.

However, in today's society, deeply permeated with digital devices and technological advances, Research can no longer be essentially individual, but it has to become increasingly collaborative, involving multidisciplinary teams and international networks.

Being both a global and a civic University of the 21st century, NOVA is very much aware of the importance of research and knowledge-based innovation to address the most pressing needs of our Society, and we are strongly motivated to be part of that effort. Sustainability is at the core of all these societal challenges, and at all levels: community level, municipality level, national level and beyond. Therefore, we are deeply committed to contribute, at all those levels, to the Agendas for Sustainable Development and Innovation, which increasingly requires smart specialization and interdisciplinary approaches.

Since our Research already covers a wide range of knowledge fields, we are now focusing on the development of interdisciplinary areas with one common purpose: social impact.

Our Research topics are either hyperspecialized or interdisciplinary but intimately connected with social impact. Here, I would like to highlight the Collaborative Laboratories, a wonderful initiative aimed at building bridges between science, economic activity and society at large. Last year, our University responded enthusiastically to this call, and we are now participating in nine CoLAB and coordinating two of them. And we are ready to carry on developing CoLAB for the years to come.



NOVA has become a research-oriented university and, most importantly, a university that combines fundamental research with collaborative agendas tackling real problems and challenges posed by society, their institutions, and by the sustainable development goals

The future of Research at NOVA is definitely not about building walls but about building bridges, within our local communities but also outreaching to Europe and to other regions, namely but not exclusively, Portuguese speaking countries. It will be a dynamic balance between fundamental and applied research, based on hyperspecialization and interdisciplinary approaches, and aimed at delivering innovative solutions with social and economic impact. But in order to get there, we need to break down every single wall that keeps Research and innovation from prospering, to continue promoting talent and to invest in the best partnerships, national and international. Only then, we can create meaningful and impactful knowledge. One that goes beyond our own imagination. ■■ João Sàágua

3

MESSAGE FROM THE VICE- RECTOR FOR RESEARCH

Elvira Fortunato
NOVA UNIVERSITY LISBON



Rodrigo Mendes - Madremedia

3

CLIMBING TO EXCELLENCE AND SUCCESS AT NOVA

NOVA University Lisbon is proud of the set of achievements obtained during 2019. We had excellent results in the last evaluation of the Research Units done by the Portuguese Foundation for Science and Technology (FCT, I.P.) where 87% have been classified with “Excellent” and “Very Good”. This leaves us particularly satisfied as it recognizes the quality of our research teams and their outputs as well as our organizational capabilities.

The degree of NOVA internationalization is another important aspect. Our Research, in line with the Sustainable Development Goals of the United Nations, tackles complex, interdisciplinary problems, many of them global. Collaboration is, therefore, key. Over the last five years we have collaborated with more than 150 countries and 50% of our scientific papers have been published with at least one institution outside Portugal.

The topic of collaboration brings us to the Collaborative Laboratories (CoLAB), instrumental in joining the academy with industries, producing synergies that encourage knowledge transfer to the market while simultaneously creating qualified research jobs. NOVA has been participating in CoLAB since the launch of the initiative and intensified this work in 2019, giving a whole new meaning to research with impact.

In 2019, the “NOVA Research Portal” was launched, featuring validated data in NOVA’s Current Research Information System (CRIS) – PURE. With this integrated tool it is expected to increase the scientific and technological impact of NOVA and simultaneously to promote synergies among the researchers. Approximately 3250 individual researchers can now access PURE directly, and the nine academic units of NOVA have so far uploaded publications affiliated with around 5700 NOVA researchers.

This year we have celebrated the talent at NOVA, and especially we acknowledged the extraordinary and excellent work of our European Research Council (ERC) grantees. NOVA University hosts a total of 19 ERC grants, placing NOVA as one of the top national institutions.

By challenging the world’s brightest minds, the ERC expects that its grants will contribute to bring new and unpredictable scientific and technological discoveries – the kind that can form the basis of new industries, markets, and broader social innovations of the future.



Ideas are independent of SCHOOLS, UNIVERSITIES or even COUNTRIES’ size, but rather fully depend on PEOPLE and HARD WORKERS! Thus, I do expect new ideas and that you use your imagination to the maxima fulfilling our new dreams....

The second edition of the NOVA Science Day had the special participation of the ERC President, Prof. Bourguignon sharing his savvy vision about the ERC programme, and providing an opportunity to discuss current and future scientific opportunities.

Again, like the year before, this meeting was dedicated to connecting the NOVA scientific community, for the benefit of science and technology, in a more dynamic and interactive way, and to promoting interdisciplinarity as a first step towards boosting creativity and innovation.

In recognition of collaboration and interdisciplinary research work we congratulate the winners of the 2018/19 edition of the Santander/NOVA Collaborative Research Award – Dr Ana Pimentel from FCT NOVA and Dr Vanessa Pereira from ITQB NOVA – and thank the trust of Santander in NOVA by supporting this research prize for more than 12 years.

Ideas are independent of SCHOOLS, UNIVERSITIES or even COUNTRIES’ size, but rather fully depend on PEOPLE and HARD WORKERS! Thus, I do expect new ideas and that you use your imagination to the maxima fulfilling our new dreams....

Dear colleagues, dear all, I strongly believe in the power of ideas and in the power of dreams. Now, more than ever, it is time to think big and aim for the top. We count on ALL OF YOU!

■ ■ ■ Elvira Fortunato

4 RESEARCH

4 RESEARCH

The NOVA University Lisbon hosts 40 Research and Development Units (R&D), 24 of which are research partnerships between NOVA and other national institutions. In 2018, the Portuguese Foundation for Science and Technology (FCT, I.P.) evaluated 87% of NOVA's R&D Units with "Excellent" or "Very Good". These results were way above the national average of Portuguese Universities.

Research at NOVA has been growing and developing, both at quantitative and qualitative level. NOVA is responsible for approximately 12.6% of the national research papers indexed in Scopus (Source: data obtained in Scopus - May 2020).

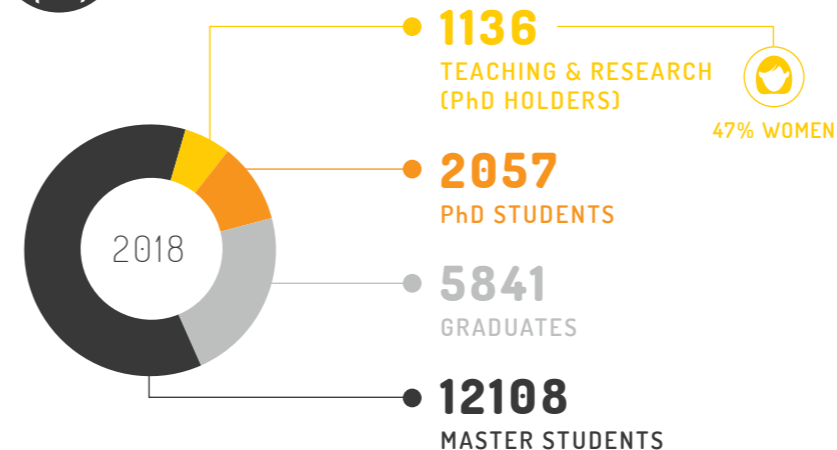
NOVA is the Portuguese University with the best performance (scores/FTE) in the Horizon 2020 Framework Programme. It is worth highlighting that, since the launch of the European Research Council (ERC) Grants programme in 2007, NOVA's researchers were awarded a total of 19 grants, placing NOVA as one of the top national institutions. Given the competitiveness of current funding programmes, since 2014, NOVA has started a capacitation programme for researchers, TALENT@NOVA, aiming at increasing their competitiveness both at national and international levels.

The improved performance of NOVA in terms of research can be seen in the international rankings' scores and positioning. The good results achieved in the main rankings of Universities with less than 50 years, have granted NOVA the inclusion in YERUN (Young European Research Universities Network). The goal of YERUN is to have young research universities to cooperate towards increasing the influence of the young universities on research policies promoted by the European Union.

Since 2018, NOVA participates in nine Collaborative Laboratories (CoLAB) funded by FCT, I.P. and is the Coordinator Institution of two of them. ■■



STAFF



PUBLICATIONS



9 CoLAB
COLLABORATIVE LABORATORIES
NOVA FUNDING
FCT, I.P. | 2018

28,5M€

RESEARCH HIGHLIGHTS



19 European Research Council (ERC) Grants.



87% of NOVA's Research Units evaluated by the Portuguese Foundation for Science and Technology (FCT, I.P.) with "Excellent" and "Very Good".



NOVA is aligned with the United Nations 2030 Agenda for Sustainable Development through the Institute for Global Development - NOVA4theGlobe.



NOVA stands out in the Leiden Ranking 2019 for the Scientific Impact, Collaboration and Gender equality.



NOVA participates in nine Collaborative Laboratories (CoLAB) funded by FCT, I.P. and is the Coordinator Institution of two of them.



In the last five years, NOVA had more than 50% of International Collaborations (NOVA Research Portal).

NUMBER OF COLLABORATIONS PER COUNTRY

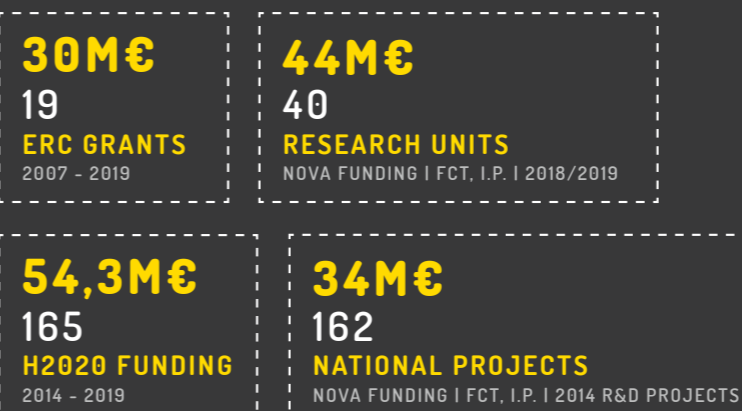


- SPAIN 1507
- UNITED KINGDOM 1450
- UNITED STATES 1295
- GERMANY 1098
- FRANCE 1070
- BRAZIL 1051
- ITALY 959
- NETHERLANDS 731
- SWITZERLAND 536
- AUSTRALIA 535
- SWEDEN 528
- DENMARK 515
- RUSSIA 486
- POLAND 483
- CHINA 469

SOURCE: SciVal



FUNDING



5

NOVA RESEARCH PORTAL

5 NOVA RESEARCH PORTAL

The NOVA Research Portal public portal was launched in February 2019 and features validated data in NOVA's Current Research Information System (CRIS) - PURE.

Approximately 3250 individual researchers can now access Pure directly, and NOVA's nine academic units have so far uploaded publications affiliated with around 5700 NOVA researchers.

In terms of content, PURE already has 53500 validated scientific outputs (in all types), of which 39000 are peer-reviewed articles.

Thus, as the quality of the data validated in PURE has been evolving in a very positive way, it was possible to launch the new public portal NOVA Research Portal (<https://novaresearch.unl.pt/>) with the objective of increasing the impact of NOVA's scientific production and research community.

We would like to highlight the following features introduced by the new portal:

COLLABORATION MAP

Displays all global external collaborations with other institutions at University, research unit or researcher level. It is possible to select a country and get the total number of collaborations by institution.



Welcome to Universidade NOVA de Lisboa



NETWORK TOOL

When selecting a unit or researcher, the "Network" feature provides a visual network of internal and external collaborations, in a customizable timeframe and according to a set number of collaborations.

FINGERPRINT

Based on the abstract and keyword information imported and validated in PURE, the "Fingerprinting" engine calculates the main research topics of the selected entity (university, department, research unit or researcher).

Pure Experts Community: by launching this new portal, NOVA is now part of an international network of institutions with the same PURE portal. Therefore, the Fingerprinting engine can look for profiles of international researchers who conduct research on a particular topic, by searching the entire Pure Experts community.

(Select "Profiles", enter search term and choose "search as concept" to try this feature).

The CRIS project at NOVA continues to focus on its main goal of ensuring interoperability with other national and international systems in compliance with international standards, allowing researchers to enter data only once in PURE and reuse it multiple times in other existing scientific data collection platforms.



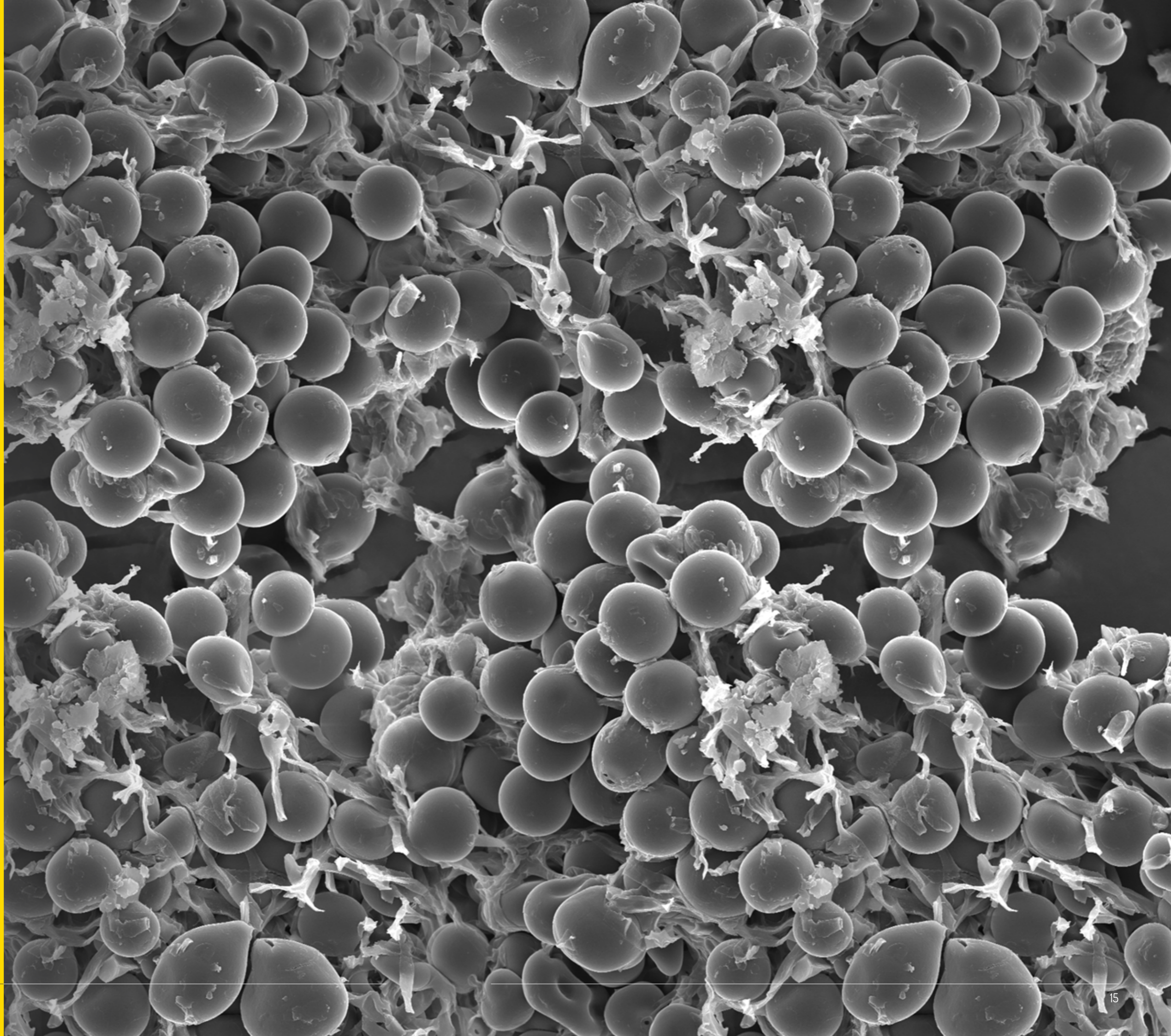
As a consequence of this goal, and in addition to the existing connectors with the RCAAP network's institutional repository (RUN) and the European Commission's OpenAIRE portal that help NOVA's community comply with national and international Open Access mandates, a link to the new Ciência Vitae project from the Portuguese Foundation for Science and Technology (FCT, I.P.) was also established.

This link is established via ORCID, and the NOVA research community is offered the ability to automatically populate *Ciência Vitae* with validated outputs in PURE.

For more information: www.unl.pt/en/research/pure-information-management-system

6

ACADEMIC UNITS



ACADEMIC UNIT

NOVA SCHOOL OF SCIENCE AND TECHNOLOGY

> ACRONYM

FCT NOVA

> DEAN

Virgílio Cruz
Machado

> CONTACTS & LOCATION

Campus de Caparica
2829-516 Caparica
+351 212 948 300

> WEBSITE

www.fct.unl.pt

> SCIENTIFIC AREAS

CIRCULAR ECONOMY &
SUSTAINABILITY

DIGITAL INNOVATION & BIG DATA

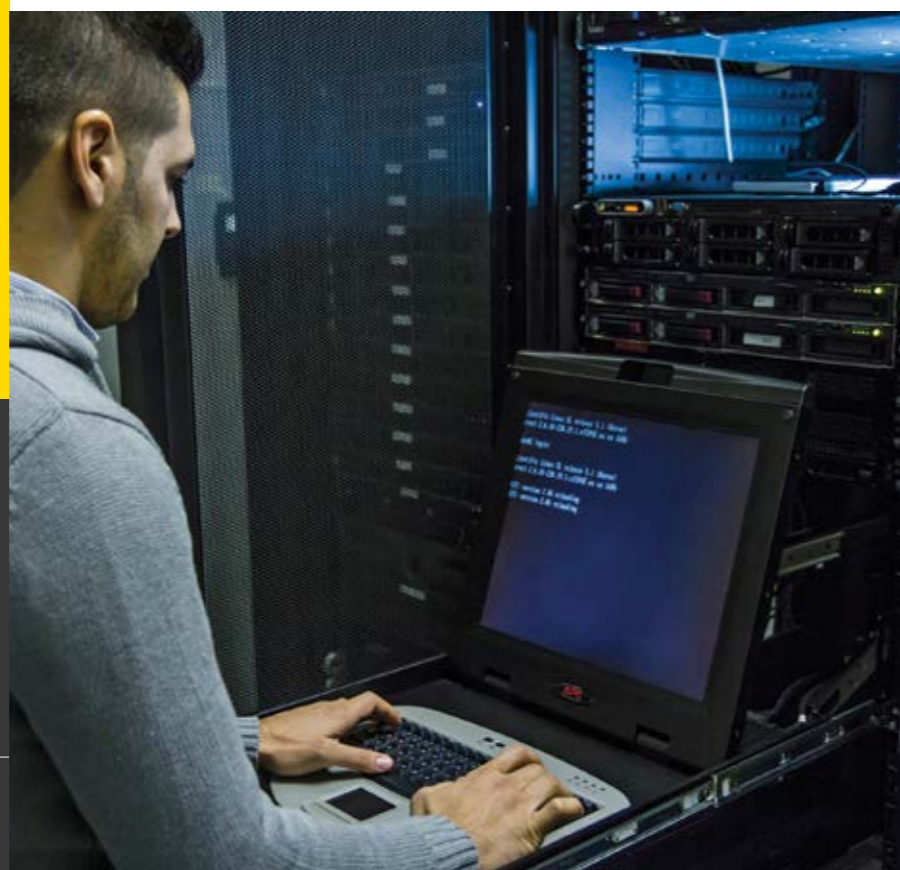
E-HEALTH, BIOMEDICINE &
BIOMEDICAL DEVICES

LOGISTICS, MANUFACTURING &
AUTOMATION

MICRO, NANO & SMART MATERIALS

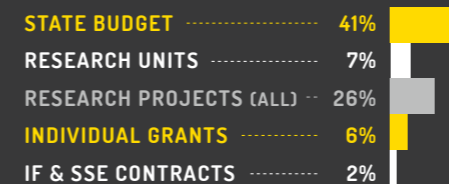
ARTS & CULTURAL HERITAGE

SPACE, SECURITY & DEFENCE
TECHNOLOGIES



FACTS AND FIGURES 2019

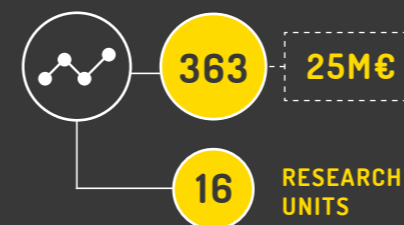
> FUNDING



> RESEARCH STAFF



> ONGOING RESEARCH PROJECTS



> EDUCATION



> PUBLICATIONS 2018



BRIEF DESCRIPTION

NOVA School of Science and Technology (FCT NOVA) is a prestigious School of Engineering in Portugal. A young School with a multicultural environment, FCT NOVA is one of the 50 best Universities in Europe under 50 years old, contributing to the development of both individuals and society through high-quality education and outstanding research. FCT NOVA is the youngest public university in the Lisbon metropolitan area. It has a strong tradition of working in innovative areas. Being a higher education international institution, its scientific research and quality teaching are well recognised, which ensures a high level of professional success for its students and researchers.

FCT NOVA hosts several research centres across various research areas, particularly in Digital Innovation & Big Data, Biomedicine & Biomedical Devices, Circular Economy & Sustainability, Manufacturing & Automation, Nano & Smart Materials, Arts & Cultural Heritage, Security & Defence Technologies. FCT NOVA has in its genes a drive to enhance the technologies supported by science; it has a unique profile in terms of its research path. This means that FCT NOVA is well prepared to address the industrial and societal needs and respond to current challenges.

The participation in nine COLABs and the eight ERC scholarships obtained by FCT NOVA researchers (the largest concentration of these laboratories and scholarships in Portuguese Universities), demonstrates how NOVA School of Science and Technology is oriented towards the future and based on vanguard international research.

HIGHLIGHTS

- (1) Over 80% of FCT NOVA's R&D Units rated Excellent or Very Good by the Portuguese Foundation for Science and Technology (FCT, I.P)
- (2) Portuguese higher education institution managing the most amount of H2020 funds
- (3) Results of FCT NOVA's scientific production with value 1.49 SciVal index, 49% above world average
- (4) Collaboration in nine collaborative laboratories, which is half of the nationally approved number
- (5) FCT NOVA has so far obtained eight ERC Grants (Portuguese Higher Education Institution with more obtained ERC Grants)

ACADEMIC UNIT

NOVA SCHOOL OF SOCIAL SCIENCES AND HUMANITIES

> ACRONYM

NOVA FCSH

> DEAN

Francisco Caramelo

> CONTACTS & LOCATION

Avenida de Berna, 26-C
1069-061 Lisboa
+351 217 908 300
geral@fcsch.unl.pt

> WEBSITE

www.fcsch.unl.pt

> SCIENTIFIC AREAS

ANTHROPOLOGY
ARCHAEOLOGY
ART HISTORY
COMMUNICATION SCIENCES
GEOGRAPHY
HISTORY
LINGUISTICS
LITERARY STUDIES
PHILOSOPHY
MUSICAL SCIENCES
POLITICAL SCIENCE AND
INTERNATIONAL RELATIONS
PORTUGUESE STUDIES
SOCIOLOGY
TRANSLATION STUDIES.



FACTS AND FIGURES 2019

> FUNDING



STATE BUDGET	19,4%
RESEARCH UNITS	28,3%
RESEARCH PROJECTS (ALL)	1,0%
INDIVIDUAL GRANTS	0,3%
IF & SSE CONTRACTS	51,0%

> RESEARCH STAFF



1033 PhD Holders (Teaching and Research)
185 PhD Students
2772 Graduates (new and ongoing)
212 Staff Members
1610 Master Students (new and ongoing)

> ONGOING RESEARCH PROJECTS



89

15.0M€

16

RESEARCH UNITS
14 FUNDED BY FCT

> EDUCATION



ONGOING
COURSES

25 Doctorate
43 Master
15 Bachelor

DEGREES
AWARDED

80 PhD
335 Master
625 Bachelor

> PUBLICATIONS 2018



360 Indexed Publications
0.81 Normalized Impact
21.8 % of publications with international collaboration
2.9 % of publications in the top 10% of most cited worldwide

BRIEF DESCRIPTION

NOVA FCSH is the largest Portuguese Higher Education and Research institution in the fields of Social Sciences, Arts and Humanities, covering such areas as Communication and Language Sciences, Artistic and Literary Studies, Philosophy, History and Archaeology, Anthropology, Geography and Sociology, Political Studies and International Relations, and intersections between these disciplines. NOVA FCSH pursues teaching and research excellence, both at national and international levels, a clear commitment to innovation and interdisciplinarity, the dissemination of a humanistic spirit, and the provision of services to the community in its areas of expertise. Internationalization plays a key strategic role in the pursuit of these goals.

NOVA FCSH offers various (incoming as well as outgoing) mobility programmes to its faculty members, researchers and students (e.g. Erasmus, Erasmus Mundus, Leonardo da Vinci, Portuguese-Brazilian Santander University Scholarships, Council for International Educational Exchange, Exchange Programmes with China). Cooperation is achieved and formalized by several protocols between NOVA FCSH and foreign higher education institutions and research organizations (e.g. the UT Austin – Portugal Programme) and participation in a number of international teaching and research networks.

NOVA FCSH develops cutting-edge research in different scientific areas in its 16 R&D Units, of which 14 are financed by the Portuguese Foundation for Science and Technology, ranked 8 as “Excellent” and 4 as “Very Good”. Our research teams are composed of several senior and junior researchers, some of latter carrying out their own PhD investigations within the framework of the institution’s larger projects. The ever-growing academic community at NOVA FCSH counts over 2.000 national and international researchers integrated and/or associated to a Research Unit, as well as many other co-researchers, students and research grant holders. There are currently over 80 fundamental and applied research projects running at NOVA FCSH, by various programmes of the European Commission and its FP7 and H2020 Programme (Marie Curie IRSES, Marie Curie EF and GF, Marie Curie ITN, ERC, REGIO, Cooperation, Safer Internet Programme, Trans-European Transport Network, etc.) and by several other public and private institutions as well (e.g. Santander Totta, Gulbenkian Foundation, etc.).

HIGHLIGHTS

- (1) Internationally recognized research;
- (2) Multiple disciplinary strengths promoting interdisciplinarity;
- (3) Closer relationship between teaching and research / curricula diversity;
- (4) High critical mass;
- (5) Strong social and cultural commitment.

ACADEMIC UNIT

NOVA SCHOOL OF BUSINESS & ECONOMICS

> ACRONYM

NOVA SBE

> DEAN

Daniel Traça

> CONTACTS & LOCATION

Carcavelos Campus
Rua da Holanda, no. 1
2775-405 Carcavelos
+351 213 801 600

> WEBSITE

www2.novasbe.unl.pt

> SCIENTIFIC AREAS

ECONOMICS
MANAGEMENT
FINANCE



BRIEF DESCRIPTION

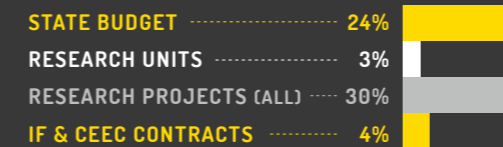
Nova SBE's mission is to build a global school dedicated to the development of talent and knowledge that impacts the world. It aims to achieve this mission by building a school for the future, focused on producing relevant knowledge and engagement for a new society, future-proofed skills for lifelong learners, and supporting the acceleration for new ventures and the transformation of agile incumbents. The Research Unit is closely aligned with the School's mission and adopts a cross-disciplinary orientation.

Researchers are gathered in a single unit, recognizing the variety of research that takes place in the School. The President of the Faculty Council is responsible for coordinating the research strategy, and the Vice-President assumes the role of the Unit's coordinator. They are assisted by professors that represent the major fields of Economics, Finance, and Management, and act as a steering committee for research. An External Advisory Committee with renowned scholars undertakes periodic evaluations of the Unit's activities.

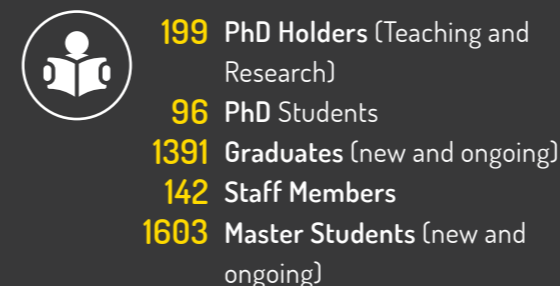
The Carcavelos campus is a cornerstone for the dynamics of progress supporting the School's ambition to become a global brand in higher education: attracting high-quality talent (students and faculty); promoting a sense of belonging in alumni; enhancing corporate and institutional partnerships; fundraising for investing in academic quality; and improving international visibility. During 2019 the campus hosted top international conferences such as the 46th annual meeting of the European Finance Association; the annual Global Business School Network conference; Estoril Conferences; EFMD, the leading international network for management development; and TechShare.

FACTS AND FIGURES 2019

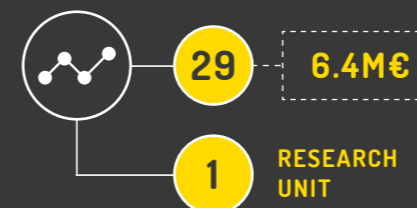
> FUNDING



> RESEARCH STAFF



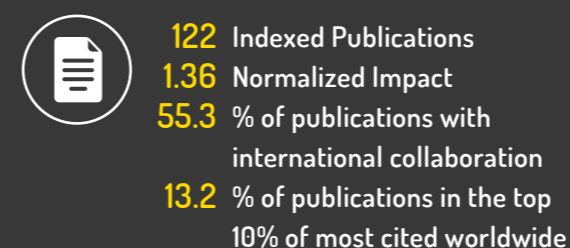
> ONGOING RESEARCH PROJECTS



> EDUCATION



> PUBLICATIONS 2018



Researchers benefit from excellent conditions, including the School's participation in international networks, and weekly seminar series with top international speakers, giving them the opportunity to gain exposure to state-of-the-art research.

Nova SBE is determined to keep research at the core of its mission, recognizing that a top European school should be at the forefront of research and science outreach. It leverages the research and societal engagement through Knowledge Centers (KC), Labs and Hubs. To these structures, during 2019, were joined two KC (Economics of Education and Data Science), two Labs (Digital Experience and Behavioral), and two Hubs (Entrepreneurship and Sustainability). They join a well-established network of KC that increasingly contribute to science, in the fields of Finance, Leadership for Impact, Development in Africa, Economics for Policy, Environmental Economics and Health Economics.

During 2019 our researchers secured funding from the European Union for three very significant projects: a twinning project in paradoxes in management, an ERC grant that connects data and social sciences, and a research project aiming to study migrations to Europe. The School is also proud of having one of its researchers selected by the European Union to integrate the Horizon Europe's mission committee on "cancer". Nova SBE hosts the Social Sciences Data Lab, an infrastructure integrated in the National Roadmap of Research Infrastructures that, in a partnership with University of Minho, also supports the SHARE-ERIC project.

Nova SBE's quality is evident in its increasing position in the most valued international rankings for business and economics schools, as well as in the recognition of the Research Unit as "Excellent" by the FCT's evaluation exercise that took place in 2018-2019.

HIGHLIGHTS

(1) Joana Gonçalves Sá € 1.5 million Starting Grant from the European Research Council (ERC), for the Fake News and Real People – Using Big Data to Understand Human Behaviour (FARE) project.

(2) Three new Chairs endowed by private partners: BPI | Fundação "La Caixa" Chairs in Health Economics (Professor Pedro Pita Barros), and in Responsible Finance (Professor Miguel Ferreira); and Gulbenkian Chair of Impact Economy (Professor Pedro Oliveira).

(3) Twinning project funded by the European Union, entitled "Developing a European Forum on Paradox and Pluralism" (EUFORPP) to a Consortium of 5 top European business schools led by Nova SBE.

(4) Nova SBE Finance Knowledge Center curated the 46th annual meeting of the European Finance Association, the largest finance conference in Europe.

(5) The €1 million European Commission grant for the "Information Gaps and Irregular Migration to Europe", led by Cátia Baptista, which aims to assess the impact of different policies to reduce irregular migration to Europe.

ACADEMIC UNIT NOVA MEDICAL SCHOOL

> ACRONYM NMS

> DEAN Jaime da Cunha Branco

> CONTACTS & LOCATION

Campo dos Mártires da Pátria, 130
1169-056 Lisboa
+351 218 803 000

> WEBSITE www.nms.unl.pt

> SCIENTIFIC AREAS

CHRONIC DISEASES
CLINICAL AND PUBLIC HEALTH
TRANSLATIONAL AND
PERSONALISED MEDICINE
TOXICOLOGY



BRIEF DESCRIPTION

NOVA Medical School (NMS) is an academic unit of NOVA University Lisbon since 1977. It currently has 1.719 Students enrolled in the Integrated Master Degree in Medicine, and 20 in the Bachelor's Degree in Nutrition Sciences. NMS has a total of 546 professors and researchers and is the Medical School with the best tutor/student ratio (1/3) in clinical years in Portugal. It is associated with several health units, allowing a variety of teaching environments and a more comprehensive knowledge of hospital reality and primary health care. In 2015, NMS was awarded the Ministry of Health Gold Medal for Distinguished Services. In the same year, NMS and Centro Hospitalar de Lisboa Central signed the consortium that created the University Medical Centre of Lisbon. This consortium allows the NMS students a better and more integrated clinical training, stimulates the development of clinical research and offers better conditions for lifelong learning to health professionals.

The Chronic Diseases Research Centre (CEDOC) is an established centre that aims at excellence in medical research on chronic diseases. The general objectives of CEDOC are to form an internationally-recognized Centre of excellence in Biomedical, Translational and Clinical Research on chronic diseases; stimulate collaborative research between groups within NMS; strengthen research quality and innovation and promote multidisciplinary projects within and beyond the Centre; provide an exciting research environment for the training of Postdoctoral Fellows, PhD and Master funding at national and international levels; and simulate the organization of outreach activities at local and national levels. CEDOC is a partner in three R&D Units: Comprehensive Health Research Centre (CHRC), iNOVA4Health - Programme in Translational Medicine (iNOVA4Health) and Centre for Toxicogenomics and Human Health (ToxOmics).

CHRC is a multidisciplinary, multi-institutional and comprehensive new research centre aimed at supporting, developing and fostering clinical, public health and health services research. The other CHRC's management units are ENSP NOVA, Évora University, Hospital de Santo Espírito, Lisbon Institute of Global Mental Health (LIGMH).

FACTS AND FIGURES 2019

> FUNDING



RESEARCH UNITS	22,6%	
RESEARCH PROJECTS (ALL)	29,6%	
INDIVIDUAL GRANTS	6,3%	
IF & SSE CONTRACTS	41,5%	

> RESEARCH STAFF



158 PhD Holders (Teaching and Research)
115 PhD Students
52 Graduates (new and ongoing)
20 Staff Members
69 Master Students (new and ongoing)

> ONGOING RESEARCH PROJECTS



67

9.4M€

3 RESEARCH UNITS

CHRC - Comprehensive Health Research Centre
iN4H - iNOVA4Health
ToxOmics - Centre for Toxicogenomics and Human Health

> EDUCATION



ONGOING COURSES

DEGREES AWARDED

7 Doctorate
8 Master
2 Bachelor

20 PhD
22 Master
222 Bachelor

> PUBLICATIONS 2018



420 Indexed Publications
1.55 Normalized Impact
47.0 % of publications with international collaboration
20.0 % of publications in the top 10% of most cited worldwide



iNOVA4Health - Programme in Translational Medicine, is a major partnership involving iBET, IPOLFG and ITQB NOVA. iNOVA4Health's mission is the pursuit of excellence in basic, developmental, preclinical & clinical research, through international cooperation.

ToxOmics aims to carry out innovative research and advanced education and training towards a better assessment of genetics as a determinant of health, allowing more accurate disease prediction and prevention as well as more effective therapeutic interventions. This Research Unit also involves INSA.

For more information: <http://www.nms.unl.pt/>, <http://cedoc.unl.pt/>

HIGHLIGHTS

- (1) Medical and Nutritional Sciences Training
- (2) Focus on post-graduation programmes
- (3) Research and innovation on the biomedical sciences field
- (4) Excellence in education and priority to new teaching methods based on innovation
- (5) Inter-institutional participation joining biomedical and clinical research at a global level

ACADEMIC UNIT

NOVA SCHOOL OF LAW

> ACRONYM

NOVA SCHOOL OF LAW

> DEAN

Mariana França Gouveia

> CONTACTS & LOCATION

Campus de Campolide
1099-032 Lisboa
+351 213 847 400

> WEBSITE

www.novalaw.unl.pt

> SCIENTIFIC AREAS

LAW



BRIEF DESCRIPTION

NOVA School of Law was founded in 1996. Its first undergraduate program was launched in 1997 as an 'innovative hub' within the context of the development of legal science. This program aimed and still aims at preparing students to meet the requirements associated with practicing law and participating in scholar and political debates as well as in the public life in general.

Nowadays, NOVA School of Law cooperates with other NOVA schools actively, in order to enrich its syllabus with interdisciplinary elements. Besides this, it has signed and currently applies a wide range of international exchange agreements in the context of the Erasmus program as well as protocols of cooperation with non-European academic institutes, such as from Brazil. As far as postgraduate studies are concerned, NOVA School of Law offers nine master programs, including in innovative fields of legal research, such as the field of 'law and technology', 'law and security, and 'law and management'. Additionally, it provides a program of doctoral studies, which has been distinguished with the 'FCT doctorate' seal given its high quality; the latter has also ensured *inter alia* the awarding of research grants.

The faculty staff includes professors with various backgrounds in terms of scientific expertise, professional experience (complementary to the academic one) and even origin (having recently appointed two foreign professors for the very first time in the area of civil and criminal law). Moreover, the members of the Department are active members of various academic networks in Europe and around the world in the fields of their expertise. On top of this, the school is a member of multinational organisations,

FACTS AND FIGURES 2019

> FUNDING

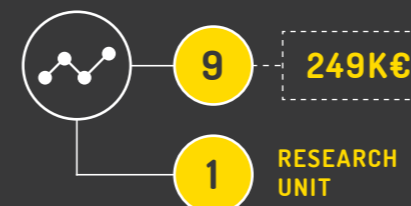


STATE BUDGET	36%
RESEARCH UNITS	2%
RESEARCH PROJECTS (ALL)	6%
INDIVIDUAL GRANTS	1%
IF & SSE CONTRACTS	1%

> RESEARCH STAFF



> ONGOING RESEARCH PROJECTS



> EDUCATION

ONGOING COURSES	DEGREES AWARDED
3 Doctorate	5 PhD
9 Master	76 Master
1 Bachelor	95 Bachelor

> PUBLICATIONS 2018



such as the Venice-based European Inter-University Centre in Human Rights and Democratization.

The research activities of both the faculty members and the doctoral students are being hosted by the research centre 'CEDIS' (Centre for Research & Development in Law and Society). The latter was founded in 2004, and has radically contributed to the widening of the research portfolio of NOVA School of Law through an innovative approach to legal research. In this context, NOVA School of Law has already participated in a great variety of research projects, including projects on 'law and literature', history of the law in Portuguese-speaking countries, contracts performance, post-national sovereignty, and discrimination of HIV-patients. CEDIS applies an interdisciplinarity-orientated strategy to achieve a wider collaboration with students, researchers and professors.



HIGHLIGHTS

- (1) Innovative teaching and learning methodologies (e. g. Moot Courts, legal coding, interdisciplinary legal practice)
- (2) Breakthrough interdisciplinary research groups (e. g. Nova Consumer, Compliance and Tax Labs, Nova Dispute Resolution Forum, Nova Law & Tech, SPARC – Space Law Research Centre, Criminália)
- (3) Connection to civil society (e. g. the Legislation and Data Protection Monitoring Centres, Aqueduct Project on Legal Compliance, legal clinics)

ACADEMIC UNIT

NOVA
INFORMATION
MANAGEMENT
SCHOOL

> ACRONYM
NOVA IMS

> DEAN
Pedro Saraiva

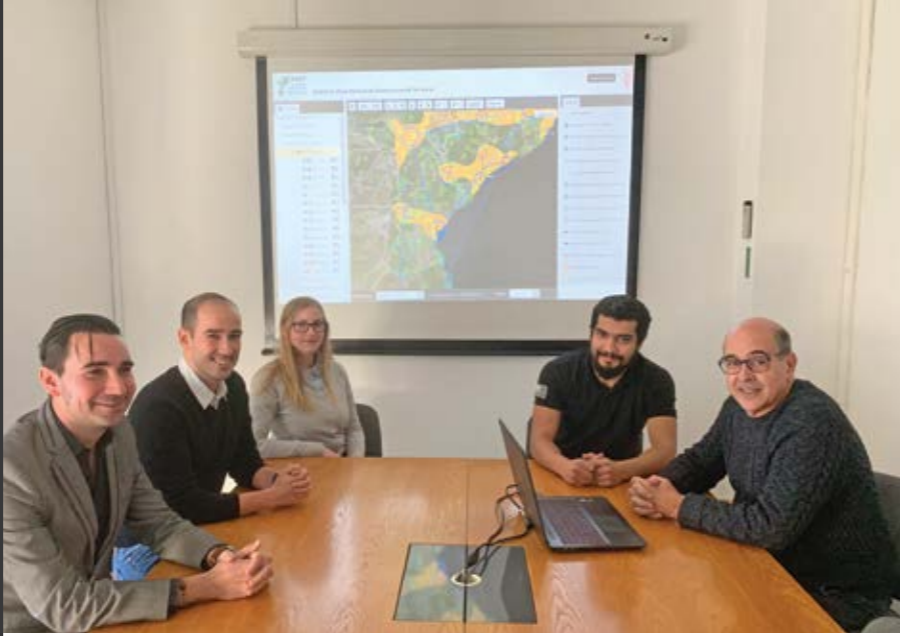
> CONTACTS & LOCATION

Campus de Campolide
1070-312 Lisboa
+351 213 828 610

> WEBSITE
www.novaims.unl.pt

> SCIENTIFIC AREAS

INFORMATION SYSTEMS
DATA SCIENCE
GEO INFORMATICS
DATA DRIVEN MARKETING

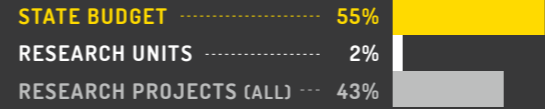


BRIEF DESCRIPTION

Nova Information Management School (NOVA IMS) is the School of Information Management and Data Science at the NOVA University of Lisbon. With a training curriculum focused on emerging areas of knowledge, NOVA IMS provides high-level education to more than 2,500 students from about 80 nationalities. Its programs cover two Undergraduate degrees (Information Management and Information Systems and Technology), nine Master's degrees, one Doctorate (Information Management) and several Post-Graduate courses, encompassing areas such as Data Science and Analytics; Data Driven Marketing; Information Systems, Finance, Risk Management, and Insurance; Geo-Informatics and Analytics; Health; Business and Information Management. The 2019 Eduniversal ranking classified NOVA IMS' Master's Degree in Information Management, with a specialization in Knowledge Management and Business Intelligence, as the best Master's in the world in the area, for the third consecutive year. Eduniversal further enshrines five masters and post-graduation courses taught at NOVA IMS, positioned in the TOP 5 of the best international education programs available. NOVA IMS was the first institution in the Iberian Peninsula to join iSchools, an international organization that brings together the best schools in the world in research and teaching of information management. NOVA IMS has the first degree in Europe accredited in Information Systems by ABET (US accreditation agency.) It is also the first university institution outside the USA to obtain the GEOINT (Geospatial Intelligence) accreditation from the United States Geospatial Intelligence Foundation (USGIF), having a part of its activities certified according to the ISO 9001 standard for Quality Management Systems.

FACTS AND FIGURES 2019

> FUNDING



> RESEARCH STAFF



> ONGOING RESEARCH PROJECTS



> EDUCATION



> PUBLICATIONS 2018



The relationship with the business world is developed through AD NOVA IMS (the Association for the Development of NOVA IMS), currently constituted by 8 partners. Through this association, leading national and international companies cooperate with NOVA IMS in research and teaching activities, offer internships to students, present applied research challenges to the master students and give awards to top performer students.

NOVA IMS has managed to achieve significant levels of internationalization, not only regarding to education, with a major demand from foreign students (in 2018 NOVA IMS had 28% foreign students coming from almost 80 different nationalities) and with the participation of internationally renowned teachers in its teaching staff, but also in research and development activities that are largely supported by international partnerships.



HIGHLIGHTS

- (1) More than 2,500 students enrolled in NOVA IMS in 12 awarding degree programs. In 2018/2019 NOVA IMS had 27% foreign students
- (2) 80 different nationalities
- (3) Five of NOVA IMS' Master and Postgraduate Programmes were ranked in the world TOP 5 of the Best Masters Ranking 2018, by Eduniversal
- (4) Main research areas: Data Science, Data-Driven Marketing, Information Systems, Geoinformatics
- (5) Our mission is to do research that explores Data Science & Analytics to go From Data to Value

ACADEMIC UNIT

NOVA INSTITUTE OF CHEMICAL AND BIOLOGICAL TECHNOLOGY ANTÓNIO XAVIER

> ACRONYM

ITQB NOVA

> DEAN

Cláudio M. Soares

> CONTACTS & LOCATION

Av. da República
2780-157 Oeiras
+351 214 469 100
info@itqb.unl.pt

> WEBSITE

www.itqb.unl.pt

> SCIENTIFIC AREAS

MOLECULAR BIOSCIENCES,
INCLUDING: CELLULAR,
MOLECULAR, CHEMICAL,
STRUCTURAL AND SYSTEMS
BIOLOGY & BIOTECHNOLOGY

MOLECULAR BASIS OF HEALTH
AND DISEASE

BIOLOGICAL RESOURCES AND
SUSTAINABLE DEVELOPMENT



BRIEF DESCRIPTION

ITQB NOVA is a leading scientific and academic unit in Molecular Biosciences: Molecular Basis of Health and Disease and Biological Resources and Sustainable Development. It is unique in its balance between science and education, giving students the opportunity to work closely with top researchers who are breaking new ground every day. In an informal atmosphere, excellence thrives, with over 4000 papers published and almost 150 thousand citations received since its inception, according to the Web of Science.

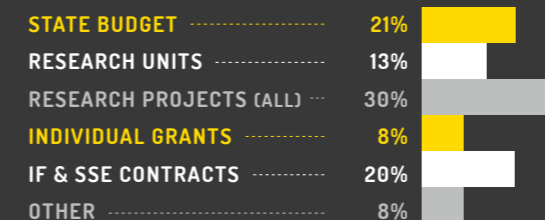
Students can choose among over 15 PhD, Master or Post-Graduation programmes, most of which in collaboration with other organic units of NOVA and beyond. Between formal and informal training, we have influenced thousands of careers not only in our research areas, but also raising awareness to technology transfer, science communication and, starting in 2019/2020, management and policy in science and technology.

At ITQB NOVA, the worlds of pure research and standard academic training meet, in a distinctive blend of characteristics, positioning ourselves into the future. This is a school of people. This is a school of scientific leaders. And, together with other institutions, we are also becoming a school of entrepreneurs. Without losing our focus on pure research, which is the basis of any value creation.

We believe that, in doing so, we honour the memory of our founder António Xavier, who created a School of Thought, an intellectual tradition, where multidisciplinary, scholarly excellence, determination, leadership and hard work set the pace.

FACTS AND FIGURES 2019

> FUNDING



> RESEARCH STAFF



> ONGOING RESEARCH PROJECTS



> EDUCATION



> PUBLICATIONS 2018



We are located in the town of Oeiras, home to several scientific institutions, high-tech industries and the most educated population in the country. The municipality is further developing these strengths by investing in science, technology and education, promoting an exceptional scientific and innovation ecosystem in a unique setting by the sea.

HIGHLIGHTS

1. Simulation of a hospital outbreak in record time

On the European Antibiotic Awareness Day, researchers of consortium ONEIDA, coordinated by the ITQB NOVA, carry out a pilot simulation of a hospital outbreak in record time. The initiative opens new perspectives for the control of bacterial infections in Portuguese hospitals.

2. Improving a biological hydrogen machine

Development of hydrogenase variants with improved properties reveals new pathways of oxygen inactivation.

Zacarias S; Temporão A; del Barrio M; Fourmond V; Leger C; Matias P* & Pereira IAC* A hydrophilic channel is involved in oxidative inactivation of a [NiFeSe] hydrogenase ACS Catalysis , DOI 10.1021/acscatal.9b02347 (IF 12.221)

3. Round and round we go

Unveiled the mechanism for elongation of cocci.

Nature Microbiology | doi.org/10.1038/s41564-019-0437-2. SEDS-bPBP pairs direct lateral and septal peptidoglycan synthesis in Staphylococcus aureus. Nathalie T. Reichmann, Andreia C. Tavares, Bruno M. Saraiva, Ambre Jousset, Patricia Reed, Ana R. Pereira, João M. Monteiro, Rita G. Sobral, Michael S. Van Nieuwenhze, Fábio Fernandes and Mariana G. Pinho*

4. Finding the trigger to apoptosis

New mechanism for cell death through ceramides in mitochondria.

Nature Communications April 2019 doi.org/10.1038/s41467-019-09654-4 Ceramides bind VDAC2 to trigger mitochondrial apoptosis. Shashank Dadsena, Svenja Bockelmann, John G.M. Mina*, Dina G. Hassan, Sergei Korneev, Guilherme Razzera, Helene Jahn, Patrick Niekamp, Dagmar Müller, Markus Schneider, Fikadu G. Tafesse, Siewert J. Marrink, Manuel N. Melo* & Joost C.M. Holthuis*

*corresponding authors

5. Do the C4 photosynthesis with me

New paper on evolution of plant photosynthesis.

Molecular Biology and Evolution, msy060, doi.org/10.1093/molbev/msy060

Synergistic binding of bHLH transcription factors to the promoter of the maize NADP-ME gene used in C4 photosynthesis is based on an ancient code found in the ancestral C3 state.

Ana Rita Borba, Tania S. Serra, Alicja Gorska, Paulo Gouveia, Andre M. Cordeiro, Ivan Reyna-Llorens, Jana Knežová, Pedro M. Barros, Isabel A. Abreu, M. Margarida Oliveira, Julian M. Hibberd, Nelson J.M. Saibo

ACADEMIC UNIT

NOVA INSTITUTE OF HYGIENE AND TROPICAL MEDICINE

> ACRONYM

IHMT-NOVA

> DEAN

Filomeno Fortes

> CONTACTS & LOCATION

Rua da Junqueira, 100
1349-008 Lisboa
+351 213 652 600

> WEBSITE

www.ihmt.unl.pt

> SCIENTIFIC AREAS

BIOMEDICAL SCIENCES
GLOBAL PUBLIC HEALTH
TROPICAL MEDICINE



BRIEF DESCRIPTION

The NOVA Institute of Hygiene and Tropical Medicine (IHMT-NOVA) (www.ihmt.unl.pt) is a NOVA University Lisbon (NOVA) unit, with strong research, development and training components. IHMT-NOVA host five MSc and six PhD programs (www.ihmt.unl.pt/ensino-1) and currently has a total of 182 MSc and 146 PhD students, (56% international). IHMT-NOVA aims at contributing to solve global health problems, particularly those afflicting the poorest and the excluded in all continents, in an equitable and sustainable way and with full respect for diversity. IHMT-NOVA has been recognized at national and international level, for its scientific quality in postgraduate teaching and excellency in specific areas of science focused on tropical medicine and health-related areas.

Research at IHMT-NOVA is carried out through its R&D Centre: GHTM - Global Health and Tropical Medicine (ghm.ihmt.unl.pt), rated as "Excellent" by the Portuguese Foundation for Science and Technology (FCT, I.P.). GHTM aims at strengthening Portugal's role as leading partner in the development and implementation of a global health research agenda. GHTM's evidence-based interventions contribute to the

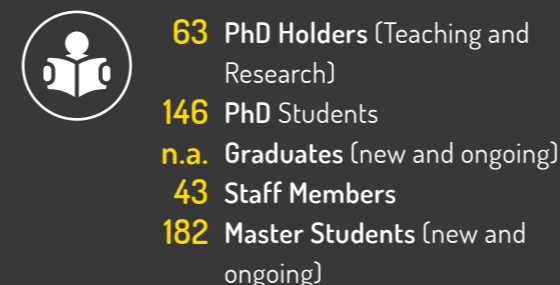
FACTS AND FIGURES 2019

> FUNDING

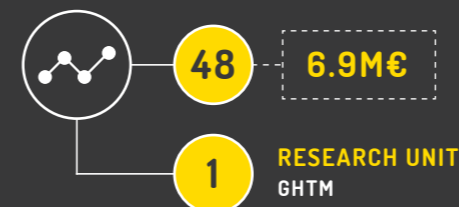


STATE BUDGET	52.40%
RESEARCH UNITS	5.91%
RESEARCH PROJECTS (ALL)	20.95%
IF & SSE CONTRACTS	2.89%

> RESEARCH STAFF



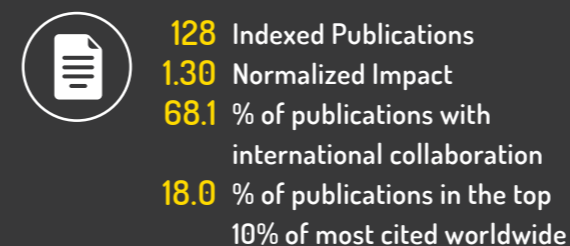
> ONGOING RESEARCH PROJECTS



> EDUCATION



> PUBLICATIONS 2018



promotion of equity in health and to improve population's health. The organizational framework of GHTM consists of four research groups; each include researchers with expertise in different areas. These are the following: Vector Borne Diseases; Tuberculosis, HIV and Opportunistic Diseases; Population Health, Policies and Services and Individual Health Care. To achieve cutting-edge outputs, GHTM operates in a transdisciplinary framework where the four research groups interact along five major research areas of shared interest - the crosscutting issues - Global pathogen dispersion and population mobility; Drug discovery & resistance; Diagnostics; Fair research partnerships, and Public health information.

We host the WHO Collaborating Centre on Health Workforce Policy and Planning that supports the WHO's strategic goal of optimizing the impact of the current and future health workforce on achieving healthy lives, universal health coverage and global health security through research, training and strategic advice as well as several WHO and EUCAST certified laboratories.

Following previous years, 2019 was also a successful year in terms of scientific outputs and approved projects, with 48 ongoing projects. Our relatively small team of 60,9 FTEs published 180 international articles, with a Field-Weighted Citation Impact of 49% above the world average for the scientific area. Full dedication to Postgraduate training continued and 13 new PhD students graduated in 2019, contributing to the strengthening of our global teaching and research network.

Besides standard laboratory facilities, GHTM has specialized infrastructures such as: BSL-3 labs; accredited animal house; insectaries for breeding mosquitoes and sandflies; a Biobank - Biotropical Resources; and an Arthropod Safety Level 3 facility - VIASEF (Roadmap for Research Infrastructures, FCT, FEDER) is under construction.

HIGHLIGHTS

- (1) UNESCO International Reference Centre | www.ciencialp.pt
A network of academic and scientific institutions in several fields led by IHMT-NOVA which aims to train 80 new doctors per year
- (2) WHO Collaborating Centre on Health Workforce Policy and Planning | <https://www.ihmt.unl.pt/>
- (3) Travel Medicine | <https://www.ihmt.unl.pt/consulta-do-viajante>
The centre of travellers and tropical medicine clinic with international renowned experts.
- (4) mosquitoWEB Citizen Science Project | <http://mosquitoweb.ihmt.unl.pt>
A Citizen's Science based initiative to early detect and control infectious diseases arthropod vectors in Portugal
- (5) BIOSAFE | <http://biosafe.ihmt.unl.pt/>
A project to understand the role played by the use of antibiotics and biocides in the community on the global emergence of antimicrobial resistance.

ACADEMIC UNIT

NOVA NATIONAL SCHOOL OF PUBLIC HEALTH

> ACRONYM

NOVA NSPH

> DEAN

Carla Nunes

> CONTACTS & LOCATION

Avenida Padre Cruz
1600-560 Lisboa
+351 217 512 100
ensp@ensp.unl.pt

> WEBSITE

www.ensp.unl.pt

> SCIENTIFIC AREAS

EPIDEMIOLOGY AND STATISTICS
GLOBAL HEALTH, HEALTH PLANNING AND GOVERNANCE
HEALTH PROMOTION
OCCUPATIONAL HEALTH
ENVIRONMENTAL HEALTH
HEALTH ORGANIZATION MANAGEMENT
HEALTH SERVICES POLICIES
HEALTH ECONOMICS
HEALTH SOCIOLOGY
HEALTH LAW AND BIOETHICS



National School of Public Health
NOVA UNIVERSITY LISBON



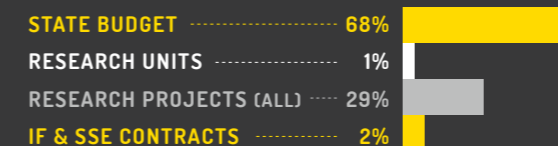
BRIEF DESCRIPTION

NOVA National School of Public Health (NSPH) is a school of NOVA University Lisbon dedicated to the teaching of 2nd and 3rd cycles and other postgraduate courses, research and service to the community, as well as development and innovation actions relevant to health. It develops its mission in the following plans:

- A) To develop research on Public Health;
- B) To promote a student-oriented teaching/learning process of excellence with an integrated and dynamic vision of health systems and Public Health sciences;
- C) To articulate research and teaching with action and innovation in Public Health;
- D) To develop mechanisms and methodologies that facilitate the intervention dedicated to knowledge / action and citizen's empowerment on health issues;
- E) To promote institutional cooperation between different institutions and sectors of activity;
- F) To contribute, within its scope of intervention, to an extensive international cooperation, with particular emphasis to the European countries and Portuguese-speaking countries, promoting an effective mobility of students and researchers at international level.

FACTS AND FIGURES 2019

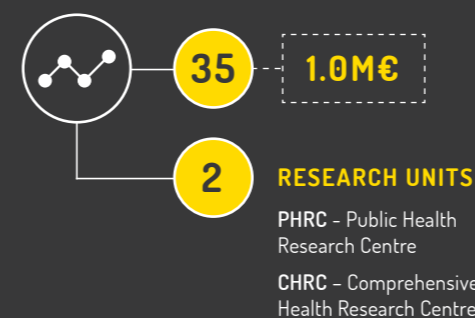
> FUNDING



> RESEARCH STAFF



> ONGOING RESEARCH PROJECTS



> EDUCATION



> PUBLICATIONS 2018



In general, postgraduate training, namely masters and doctoral degree programs, is an excellent opportunity to develop the creation of knowledge and skills in specific scientific areas.

Public Health is an important issue for the society and its groups, often addressed in the context of population health in a life cycle perspective and presents various specialties and key issues to maintain the quality of life of the population.

The health indicators, morbidity, disability and mortality have an important influence on societies since it interfere with the creation of wealth. Diseases leads to high social costs and causes intangible individual damage. Its study and knowledge can contribute to prevention and management of diseases as well as to health promotion.

Disease prevention and health promotion require, in addition to the most appropriate strategies in health management and prevention, professionals with knowledge and skills capable to promote a greater capacity for intervention to create knowledge that allows advanced action, preventing first and acting whenever necessary, among others at the level of policies and management of concrete cases that involve Public Health.

NSPH is the oldest Portuguese institution to provide training in Public Health and in this context, the educational offer, including Doctoral programs, Master's courses and post-graduate courses, are examples of how the offered courses fit the mission of this institution.

HIGHLIGHTS

(1) Our research center - Comprehensive Health Research Center (CHRC, in association with NOVA Medical School) - was evaluated with EXCELLENT, by the Portuguese Foundation for Science and Technology (FCT, I.P).

- (2) Organization of two important International Conferences:
- a. The 2nd International "Meeting on Patient Safety for New Generations of Healthcare Professionals"; in partnership with the Center for Risk Management and Patient Safety in the Region of Tuscany, Italy (World Health Organization Collaborative Center).
 - b. The International Conference "Health Literacy Interventions for Prevention and Control of Noncommunicable Diseases"; in partnership with the Associação Protetora dos Diabéticos de Portugal, the Rede Portuguesa de Municípios Saudáveis and World Health Organization.

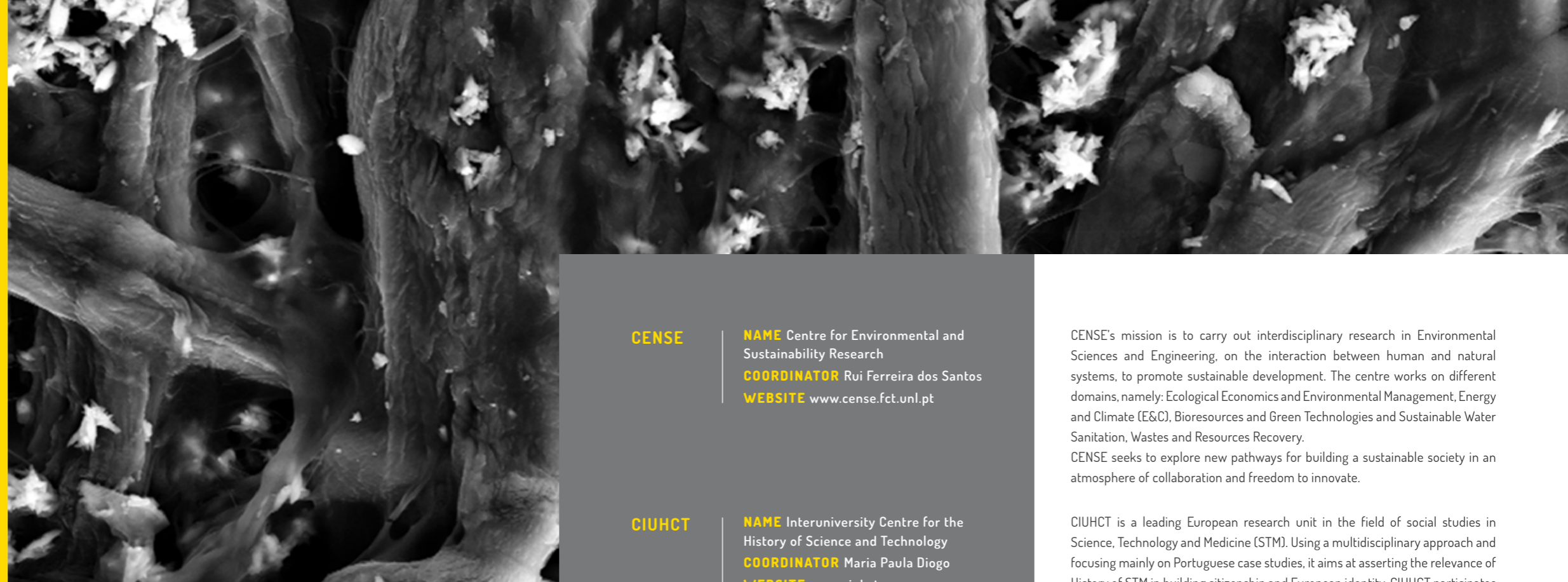
(3) Increasing pattern of academic staff and the research funding (2.6 ratio compared with 2018).

(4) The signature of 37 new collaboration protocols with national and international, public and private institutions.

(5) First Edition of the Master's Degree in Epidemiology, Biostatistics, and Health Research (EPIBIS), in association with NOVA Medical School.

7

RESEARCH UNITS



NOVA SCHOOL OF SCIENCE AND TECHNOLOGY

CEFAGE

NAME Centre for Advanced Studies in Management and Economics
COORDINATOR Joaquim Pina
WEBSITE www.cefage.uevora.pt

CEFAGE at FCT NOVA, created in 2013, is one of four branches of CEFAGE distributed throughout the country. The Centre aims at promoting the production and diffusion of high-quality research in Economics and Management and to educate PhD students in the same areas, providing them with an education that combines academic rigor with the excitement of discovery associated with doing research. CEFAGE's research activities are currently organized in 4 research groups: Strategy, Entrepreneurship & Operations; Finance; Industrial, Labor & Spatial Economics and Macroeconomics, Growth & Development. Connecting all the areas are four thematic strands: Tourism; Agrifood & Forestry; Education & Health, and Sustainability & Performance.

CEFITEC

NAME Centre of Physics and Technological Research
COORDINATOR Paulo Limão-Oliveira
WEBSITE www.cefitec.fct.unl.pt

CEFITEC at FCT NOVA brings together researchers devoted to explore activities in Engineering Physics, Applied Physics, Physics, Technological Physics and Biophysical Sciences. Research within CEFITEC focuses on scientific and technological developments on Surface Science and Vacuum Technology, Atomic and Molecular Interactions, Thin Films production, Solar Pumping Laser and Functional Molecular Systems. CEFITEC's approach to these areas consist of applying unique analytical and technical methodologies with complementary techniques and facilities within an international environment, currently compromising collaborations with 12 countries.

CENIMAT i3N

NAME Institute for Nanostructures, Nanomodeling and Nanofabrication
COORDINATOR Elvira Fortunato
WEBSITE www.cenimat.fct.unl.pt
www.i3n.org

Created in 2006, i3N is an interdisciplinary institute that results from a partnership between two leading research units in fundamental and applied science: CENIMAT (Materials Research Center, NOVA) and FSCOSD (Physics of Semiconductors, Optoelectronics and Disordered Systems, Aveiro University). Since 2018, i3N follows a strategic refocus of the main scientific activities in advanced functional materials/ devices for Nanosciences and Nanotechnologies. i3N is organized in 6 research groups and has demonstrated over the last years an excellent attractiveness for European funded projects (it holds 6 ERC grants) and is considered an international reference in the area of Materials Science and Nanotechnologies.

CENSE

NAME Centre for Environmental and Sustainability Research
COORDINATOR Rui Ferreira dos Santos
WEBSITE www.cense.fct.unl.pt

CENSE's mission is to carry out interdisciplinary research in Environmental Sciences and Engineering, on the interaction between human and natural systems, to promote sustainable development. The centre works on different domains, namely: Ecological Economics and Environmental Management, Energy and Climate (E&C), Bioresources and Green Technologies and Sustainable Water Sanitation, Wastes and Resources Recovery. CENSE seeks to explore new pathways for building a sustainable society in an atmosphere of collaboration and freedom to innovate.

CIUHCT

NAME Interuniversity Centre for the History of Science and Technology
COORDINATOR Maria Paula Diogo
WEBSITE www.ciuhct.org

CIUHCT is a leading European research unit in the field of social studies in Science, Technology and Medicine (STM). Using a multidisciplinary approach and focusing mainly on Portuguese case studies, it aims at asserting the relevance of History of STM in building citizenship and European identity. CIUHCT participates actively in international debates on the concepts of centre(s) and periphery(ies), and on the relevance of STM knowledge in the construction of modern and contemporary societies, using an innovative methodological framework centred on the trilogy circulation, appropriation and innovation. CIUHCT's organization is based on two transversal thematic groups: Instruments and Practices, Visual and Material Cultures; and Experts, Institutions and Globalization.

CMA

NAME Centre for Mathematics and Applications
COORDINATOR António Malheiro
WEBSITE www.ciuhct.org

The CMA is the only research unit dedicated primarily to Mathematics at NOVA University Lisbon. It develops, promotes and funds research in various areas of Mathematics. The centre is organized into four research groups: Algebra and Logic (AL), Analysis (An), Operations Research (OR), and Statistics and Risk Management (SRM). Its focus is on cutting edge research in both pure and applied mathematics. CMA also promotes interdisciplinary research, being currently developed along three main lines: Mathematical Biology, Mathematics for Health, and Maths for Big Data. It is part of CMA's strategic plan to engage with society by transferring knowledge to industry and business, either through providing specialized training courses or by giving solutions to real-world problems.

CTS

NAME Centre of Technology and Systems
COORDINATOR Luís Camarinha-Matos
WEBSITE cts.uninova.pt

CTS brings together researchers from four Portuguese Higher Education Institutions for the development of activities focused on systems with growing levels of intelligence, autonomy, and hyper-connectivity. CTS covers a wide spectrum of competences and seeks an interdisciplinary integration of multiple knowledge areas to cover the whole range of abstraction layers, from smart devices to large and networked cognitive systems-of-systems. CTS has become internationally recognized as a leading research centre on Inter-Connected and Cognitive Cyber-physical systems. CTS is concerned with sustainability and contributing to contemporary societal challenges, including a strong component of applied research in industry and services.

GeoBioTec

NAME GeoBioSciences, GeoTechnologies and GeoEngineering
COORDINATOR José Almeida
WEBSITE sites.fct.unl.pt/geobiotech

GEOBIOTEC is a research partnership between the University of Aveiro, FCT NOVA and the University of Beira Interior focused on the development of interdisciplinary studies in the areas of Geobiosciences, Geotechnologies and Geoengineering. From the five research groups in which the centre is organized, FCT NOVA researchers participate in three: Georesources, Geotechnics and Geomaterials (3G), Sedimentary Basins and Paleontology and Agro-Forestry.

RESEARCH UNITS

LAQV-
REQUIMTE

NAME Associated Laboratory for Green Chemistry – Clean Technologies and Processes
COORDINATOR João Crespo
WEBSITE www.requimte.pt/laqv

LIBPhys

NAME Laboratory for Instrumentation, Biomedical Engineering and Radiation Physics
COORDINATOR José Paulo Santos
WEBSITE www.libphys.fct.unl.pt

MARE

NAME Marine and Environmental Sciences Centre
COORDINATOR Maria Helena Costa
WEBSITE www.mare-centre.pt

METRICS

NAME Mechanical Engineering and Resource Sustainability Centre
COORDINATOR Benilde Mendes
WEBSITE www.metrics.unl.uminho.pt

NOVA
LINCS

NAME NOVA Laboratory for Computer Science and Informatics
COORDINATOR Luís Caires
WEBSITE nova-lincs.di.fct.unl.pt

UCIBIO

NAME Applied Molecular Biosciences Unit
COORDINATOR Maria João Romão
WEBSITE www.ucibio.pt

LAQV is the Portuguese Research Centre for Sustainable Chemistry affiliated to REQUIMTE, a network of Chemistry and Technology. LAQV spreads out of its original location in the two main national metropolitan areas of Porto and Lisbon to cover most of the national territory. Remarkably, Conservation and Restoration of Cultural Heritage at FCT NOVA has been a distinctive contribution of LAQV. The centre aims to promote Sustainable Chemistry through research, networking, training and outreach activities actively contributing to the Sustainable Development Goals. The complementary proficiencies to stimulate innovation across these thematic lines are provided by ten research groups.

The R&D activities of LIBPhys are spread out in three institutions (NOVA University Lisbon, University of Lisbon and University of Coimbra). The centre operates in the areas of Atomic, Molecular, Nuclear Physics and Electronic & Industrial Automation Instrumentation with applications to Analytical Methods, Radiation Detection and Biomedical Engineering. To coordinate the scientific research interests, four thematic strands have been identified, compromising researchers from the three research groups: the Cryogenic, Electronics and Radiation Detection Instrumentation, the Analytical Techniques Development and Applications and the Biomedical Engineering.

Established in 2013, MARE at FCT NOVA constitutes a unit of the multipolar RD&I Centre with the same name. Its mission is to seek excellence in the study of environment and disseminate knowledge to support policies for sustainable development. This mission is achieved through scientific research, education and knowledge and technology transfer to industry, as well as through the dissemination of science, establishment of collaborative networks at the regional, national and international levels. Its main research projects address the issues of Environmental Toxicology & Biotechnology, Microplastics and Marine Litter, Governance and Wastes Management.

METRiCS is a research centre in association, bringing together researchers of Engineering Schools of University of Minho and FCT NOVA, on the forefront of Mechanical, Materials and Biomedical Engineering, Energy and Bioenergy and Food Quality. The research activities focus on scientific and technological developments on advanced Engineering Design of Mechatronic Systems for Health Support, Green Mobility Systems, Conversion of Renewable Resources in Biomaterials, Bioliquids and Biofuels, Sustainable Agriculture and Forestry, Food Security and Quality and Recycling of Biomass Wastes.

NOVA LINCS is a leading research unit in Computer Science and Informatics Engineering, a pioneering national institution in the field. The mission of NOVA LINCS is to develop cutting edge scientific research in key areas of Computer Science and Informatics, contribute to advanced education in the field, and to share the produced knowledge, results, and innovation with users and communities within society. Its research targets the theme “Science and Engineering for the Global Software Ecosystem”. It unfolds in two lab-wide interacting streams: one on creating new foundations and engineering for the emergent computing and software ecosystems, another on developing innovative IT powered solutions for diverse fields.

Created in 2015 as a result of collaborative efforts of researchers from NOVA and from University of Porto, UCIBIO develops and disseminates scientific knowledge at the frontier of Chemistry and Biology, providing solutions for today’s societal challenges towards improving health and wellbeing and promoting the bioeconomy. UCIBIO’s key strength lies on its broad scope of fundamental and applied research, standing at the interface of Chemistry, Biology and Engineering to address pertinent questions at atomic, molecular, sub-cellular and cellular levels. With an interdisciplinary mindset, the UCIBIO eight research groups’ work have led to important contributions with potential applications at areas of interface, addressing major societal challenges in the area of drug development, innovative therapies and microbial virulence.

UNIDEMI

NAME Research and Development Unit in Mechanical and Industrial Engineering
COORDINATOR António Grilo
WEBSITE www.unidemi.com

VICARTE

NAME Glass and Ceramic for the Arts
COORDINATOR Márcia Vilarigues
WEBSITE www.vicarte.orgv

UNIDEMI aims to achieve world class excellence in research, development and entrepreneurial results in the scientific areas of Mechanical Engineering and Industrial Engineering and Management. UNIDEMI structure has three research groups: Systems Engineering and Management (SEM) that focus on themes of industrial systems design, engineering and management; Manufacturing and Technology Automation (MTA) that focus on advanced manufacturing processes oriented to laser welding, friction stir processing, composites machining and non-destructive testing; and Fluid and Structures Engineering (FSE), with a focus on areas of fluid-structure interaction. Over the years, UNIDEMI has developed strong links with leading international academic partners and national industrial companies.

VICARTE is devoted to the promotion of transdisciplinary research applied to Glass and Ceramics, focusing on the intersections between art and science, stimulating sharing of knowledge, experiences and methodologies. The research at VICARTE connects the present and the past, by studying traditional and historical practices, by developing new materials and by exploring different artistic concepts. VICARTE is designed to weave together diverse strands of expertise in glass and ceramic and to create a web of knowledge by connecting creative minds across disciplines, encouraging experimentation, risk taking and highly imaginative problem solving.

NOVA SCHOOL OF SOCIAL SCIENCES AND HUMANITIES

CESEM

NAME Musical Aesthetics and Sociological Studies Research Centre
COORDINATOR Manuel Pedro Ferreira
WEBSITE www.cesem.fcsh.unl.pt

CESEM is a research unit committed to the study of Music and its correlations with the other arts and the social and cultural fields, addressing a variety of approaches and engaging with the most recent perspectives and methodological trends in the Social and Human Sciences. Core areas of study on Music in CESEM include History and Cultural Heritage, repertoires and their sources, socio-communicative models and reception, cognitive and psychoacoustical processes, and applied music technologies. With five research groups and three laboratories, CESEM has achieved international recognition through the high quality and innovative character of its output.

CETAPS

NAME Centre for English, Translation and Anglo-Portuguese Studies
COORDINATOR Carlos Ceia
WEBSITE www.cetaps.com

Bringing together efforts from NOVA FCSSH and the Faculty of Letters of the University of Porto, CETAPS is committed to research in English, Translation, and Anglo-Portuguese Studies. Its research rationale is interlingual and intercultural and includes areas such as Anglophone and Portuguese Cultures and History, Shakespeare’s studies, Utopianisms, Medial and Textual transits in Ireland and Britain, and Teacher Education and Applied Language Studies. Functionally, CETAPS is guided by the aim of fostering a collaborative and integrative research culture, while finetuning the relation between providing innovative teaching, developing high-quality research, and investing in high-impact knowledge transfer, reaching out to non-academic environments and addressing societal challenges.

CHAM

NAME Centre for the Humanities
COORDINATOR João Paulo Oliveira e Costa
WEBSITE www.cham.fcsh.unl.pt

CHAM is an inter-university research unit of NOVA FCSSH and of the University of the Azores, headquartered in Lisbon. CHAM has become one of the main centres of Humanities research in Portugal, focusing its study on the notion of Frontier. The large heuristic potential of the Frontier is thus at the centre of CHAM’s project, aiming to study exchange processes and dialogues, selective adoptions and rejections, constructions and erasures. CHAM is organised in 9 research groups defined by area of study and 8 thematic lines that function as interdisciplinary meeting zones, all contributing to a multi-perspectival approach to the frontier.

CICS.
NOVA

NAME Interdisciplinary Centre of Social Sciences
COORDINATOR Luís Vicente Baptista
WEBSITE www.cics.nova.fcsh.unl.pt

CLUNL

NAME Linguistics Research Centre of NOVA University Lisbon
COORDINATOR Rute Costa
WEBSITE www.clunl.fcsh.unl.pt

CRIA

NAME Centre for Research in Anthropology
COORDINATOR José Mapril
WEBSITE www.cria.org.pt

ICNOVA

NAME NOVA Communication Institute
COORDINATOR Francisco Rui Cádima
WEBSITE www.icnova.fcsh.unl.pt

IELT

NAME Institute for the Study of Literature and Tradition – Heritage, Arts and Cultures
COORDINATOR Ana Paiva Morais
WEBSITE www.ielt.fcsh.unl.pt

IEM

NAME Institute of Medieval Studies
COORDINATOR Maria João Branco
WEBSITE www.iem.fcsh.unl.pt

CICS.NOVA, one of five branches of CICS, has the mission to undertake high quality and innovative interdisciplinary research for critical thinking in Social Sciences and policymaking. The strong interdisciplinary strategy connects and enhances the knowledge in Sociology and Geography, as nuclear areas, and other Social Sciences, but also in Environmental and Natural Sciences, in its fundamental and applied components. CICS.NOVA's research contributes to the building of regional strategies, aiming at the reconfiguration of regional maps through the development of research contracts with regional and local government bodies and civil society institutions.

CLUNL aims at the advancement of research in Theoretical and Applied Linguistics, the training of researchers and the dissemination of scientific data on those domains concerned with the nature and structure of languages and texts. CLUNL's researchers are organized in four research groups that conduct research on Language Acquisition, Comparative Syntax, Forms and Constructions in Portuguese, Lexicography and Lexicology, Multilingualism, Approaches to Language Teaching, Natural Language Processing, Theories of Text and Discourses, Terminologies and Ontologies, among others.

CRIA, an interuniversity R&D centre that brings together four units in different Portuguese Higher Education Institutions, is the main Portuguese research centre in Anthropology. With an independent approach towards knowledge production, unconstrained by perspectives and rhythms imposed by political urgency, CRIA makes a solid contribution to the knowledge of social dynamics. Encouraging interdisciplinarity and the coordination of sub-disciplinary fields, CRIA promotes comparative and transversal analyses at different spatial and historical scales through its four research groups.

ICNOVA (NOVA Institute of Communication) is a new research unit in the field of Communication Sciences in Portugal, resulting from former units (CECL and CIMJ, pioneers in the area; and CIC.Digital). Its current structure includes four groups (Media and Journalism; Culture, Mediation and Arts; Strategic Communication and Decision Making-Process; Performance and Cognition), and two labs (BlackBox and iNOVA Media Lab). ICNOVA's strategic agenda focus on Media Practices: Cultural, Societal and Technological Challenges, aiming at the achievement of inclusion and diversity in a world of social acceleration and deep mediatization. These are pursued through the following major themes: 1) Diversity, Pluralism, Inclusion; 2) Cognitive, Mediation and Decision-Making Processes; 3) Culture, Criticism and Digital Practices.

IELT's mission focuses on the study of Literature in its complex, multi-faceted and multidirectional relationship with tradition, which is considered as a vast reservoir of forms, images, figures, structures, senses and experiences that participate in the construction and in the repeated transformation of cultural, poetic and artistic identities. In this perspective, IELT claims the decisive importance of the literary phenomenon within a broad and interdisciplinary reflection on tradition and cultural identities.

Founded in 2002, IEM is the only research unit exclusively devoted to Medieval Studies. It aims to promote high quality research in the medieval field by networking with other researchers, both in Portugal and abroad, to foster international collaboration that will contribute to new, multidisciplinary and comparative approaches to the Middle Ages. It brings together experts in the fields of Archaeology, Art History, History, Literature and Musicology, jointly working on two main transversal research axes, People and Knowledge in Motion: Portugal in Trans-European Medieval Networks, and Medieval Heritage and Material Culture.

IFILNOVA

NAME NOVA Institute of Philosophy
COORDINATOR António Marques
WEBSITE www.ifilnova.pt

IHA

NAME Institute for the History of Art
COORDINATOR Joana Cunha Leal
WEBSITE institutodehistoriadaarte.wordpress.com

IHC

NAME Institute of Contemporary History
COORDINATOR Pedro Aires Oliveira
WEBSITE www.ihc.fcsh.unl.pt

INET-md

NAME Ethnomusicology Institute - Music and Dance Research Centre
COORDINATOR Salwa El-Shawan Castelo-Branco
WEBSITE www.inetmd.pt

IPRI

NAME Portuguese Institute for International Relations
COORDINATOR Nuno Severiano Teixeira
WEBSITE www.ipri.pt

IFILNOVA's main purpose is to develop research programs focused on the Philosophical investigation of Value(s), particularly by investigating the nature of Values, the role of Values in human action, as well as their normativity as constituted through public argumentation and reasoning in the ethical, political and aesthetic fields. IFILNOVA has achieved international recognition in Argumentation Theory, Pragmatics, History of Philosophy, and Philosophy of Education. The application of ground-breaking theoretical insights to social practices led IFILNOVA to being awarded funding from Horizon 2020.

IHA is hosted by NOVA FCSH and is a full member of the international RIHA (The International Association of Research Institutes in the History of Art). It is the sole Art History funded Unit in Portugal. All its five research groups approach art history in its broadest sense, considering Visual and Material Culture, Museum, Heritage, Urban Studies and Art Theory. Two Thematic Lines intersect and connect groups' activities: "The Exhibition: theory and practices" and "Cultural transfers in a global perspective". Multidisciplinary perspectives and encounters are encouraged in IHA's overall activities. IHA's work is committed to Portuguese Art History but is by no means confined to it.

With two branches, one at NOVA and another at Évora University, IHC develops its activity with an interdisciplinary approach, covering a wide range of topics concerning the historical reality of the period between the Napoleonic wars and the present time. The vast number of outreach and public history activities are organized into two programmes: The History Lab and Memory for All. This diverse profile endows the IHC with a significant responsibility for the advanced training in Modern and Contemporary History in Portugal, with an actual impact on the sustainability and renewal of the field, and on the presence and qualification of history in the public sphere. In 2019, the IHC launched the first Portuguese Digital Humanities Laboratory, supporting research as well as outreach activities.

INET-md is an interdisciplinary research unit with headquarters at NOVA FCSH and three branches in other Portuguese Institutions that aims at the development of research and creation in the fields of Music and Dance, in collaboration with several interlocutors and institutions, using current perspectives from Ethnomusicology, Historical Musicology, Cultural Studies, Popular Music Studies, Ethnochoreology, Education, Music Theory, Analysis, Performance Studies, Music Acoustics and Sound Studies. The Institute has three sound and audio-visual laboratories for the digitalization and restoration of early sound and moving image recordings, as well as sound and acoustics research.

IPRI is an Institute dedicated to advanced studies in Political Science and International Relations. IPRI works according to the paradigm of the research university integrating research and training, that is, an institute where knowledge is produced, in its fields of expertise and where teaching is carried out in a research environment. IPRI assumes its social responsibility and its public mission in the contemporary society, developing applied research, strengthening its relationship with the public policy making world and increasing its presence in the public sphere. This has been evinced by the support to decision-making, in public policies or in the entrepreneurial sector, as well as in its presence in the media, reinforcing its position in the public sphere.

RESEARCH UNITS

NOVA SCHOOL OF BUSINESS AND ECONOMICS

NOVA SBE | **NAME** Nova School of Business & Economics
COORDINATOR Miguel Pina e Cunha
WEBSITE www2.novasbe.unl.pt

The research unit of Nova SBE is closely aligned with the school's mission: to build a global school dedicated to the development of talent and knowledge that produces impact across society. Despite the research diversity, Nova SBE joins its researchers into a single unit, recognizing the variety of research that takes place in the School. The Carcavelos campus is a cornerstone for the dynamics of progress supporting the School's ambition to become a global brand in higher education by connecting high-quality students and faculty producing impactful research; a network of alumni; corporate and institutional partnerships; fundraising for investing in academic quality; and improving international visibility. Nova SBE hosts the Social Sciences Data Lab (DataLab), integrated in the National Roadmap of Research Infrastructures, providing access to an essential set of databases for conducting advanced research in Social Sciences.

NOVA MEDICAL SCHOOL

iNOVA4 HEALTH | **NAME** Advancing Precision Medicine
COORDINATOR Manuel Carrondo
WEBSITE www.inova4health.com

The aim of iNOVA4Health is to achieve excellence in translational research to improve Precision Medicine clinical practices based on increasing knowledge of the mechanisms of disease and its translation to the bedside. Created in 2015, the research unit brings together NMSIFCM through its research arm CEDOC (Chronic Diseases Research Centre), NOVA Institute of Chemical and Biological Technology António Xavier, IPOLFG (the largest cancer Hospital in Portugal in Oncology), and iBET (a private not-for-profit institution dedicated to biopharmaceuticals). iNOVA4Health represents an ambitious and pioneering effort to achieve an internationally competitive translational research programme in Portugal.

ToxOmics | **NAME** Centre for Toxicogenomics and Human Health
COORDINATOR José Rueff
WEBSITE www.toxomics.fcm.unl.pt

Established in 2015, ToxOmics makes contributions to Nanotheragnostics, Environmental Genotoxicity and Molecular Epidemiology and Genetic Determinants of disease, v.g. cancer. The R&D goals of the centre, using genomic and postgenomic methods, are the study of molecular, biochemical and cellular aspects of human genetic disorders and environmental. The centre coordinates research teams from the NMSIFCM and INSA (National Health Institute Dr. Ricardo Jorge). The Centre's mission can be described in the interplay of prevention and susceptibility to disease and in advanced training in toxicogenomics as applied to human health.

CHRC | **NAME** Comprehensive Health Research Centre
COORDINATOR Helena Canhão
WEBSITE nms.unl.pt/main/index.php?option=com_content&view=article&id=2376:comprehensive-health-research-centre-chrc&catid=2:uncategorised&Itemid=500&lang=pt

The CHRC is a multidisciplinary, multi-institutional and comprehensive new research centre rated as Excellent by the Portuguese Foundation for Science and Technology (FCT). Aiming at supporting, developing and fostering clinical, public health and health services research, CHRC pillars and central activities are health education, training and innovation. Our centre, promoted by NOVA Medical School, includes four other management partners: NOVA School of Public Health (NSPH), Évora University, Lisbon Institute of Global Mental Health (LIGMH) and Hospital de Santo Espírito da Ilha Terceira (HSEIT). CHRC mission is to produce robust evidence to improve current clinical practice, health policy and healthcare services organization.

CINTESIS | **NAME** Center for Health Technology and Services Research
COORDINATOR Conceição Calhau
WEBSITE cintesis.eu

CINTESIS is an important R&D Unit whose mission is to find answers and solutions, in the short term, to relevant health problems, without ever losing sight of the cost-benefit ratio. Hosted at the Porto University, CINTESIS takes pride in its multicentre, decentralized and flexible nature grounded in 46 partner institutions (29 HEI, 12 hospitals/health institutions and 5 health companies) and 8 HEI acting as hubs and 1 Polytechnic Institution (Nursing School of Porto). Altogether, the centre aggregates over 500 researchers, in 24 research groups working in three main thematic lines: Preventive Health and Societal Challenges (TL1), Clinical and Translational Research (TL2), and Health Data and Decision Sciences & Information Technologies (TL3).

NOVA SCHOOL OF LAW

CEDIS | **NAME** Research Center on Law and Society
COORDINATOR Armando Marques Guedes
WEBSITE www.cedis.fd.unl.pt

CEDIS was created to be an innovative research centre on Law and Society, reflecting NOVA School of Law approach to legal studies. Its strengths are a plural vision of Law in contemporary society; an interdisciplinary and innovative approach to legal research; international networking with European and Portuguese-speaking countries; different backgrounds of the researchers and an open access orientation. Its researchers are organized in clusters and projects.

NOVA INSTITUTE OF HYGIENE AND TROPICAL MEDICINE

GHTM | **NAME** Global Health and Tropical Medicine
COORDINATOR Henrique Silveira
WEBSITE www.ghtm.ihmt.unl.pt

GHTM is a R&D Centre that brings together researchers from IHMT with a track record in Tropical Medicine and International/Global Health. It aims at strengthening Portugal's role as a leading partner in the development and implementation of a global health research agenda. GHTM's evidence-based interventions contribute to the promotion of equity in health and to the improvement of populations health. Its mission is to produce knowledge on Global Health and Tropical Medicine, develop tools and strengthen health systems through excellence in research, training and systems implementation.

NOVA INFORMATION MANAGEMENT SCHOOL

MagIC | **NAME** Information Management Research Centre
COORDINATOR Tiago Oliveira
WEBSITE www.novaims.unl.pt

MagIC is focused on using information that translates into new and clever solutions for pressing societal challenges. The main objective is to contribute to the advancement of the field of Information Management and Data Science. The contributions of this research centre are focused essentially in finding ways to use information management and data science to improve productivity and sustainability through data-driven decision-making. MagIC researchers share the enthusiasm for this new and exciting field and are committed to help shape information-rich environments, as a transformative force for positive change in science and business.

NOVA INSTITUTE OF CHEMICAL AND BIOLOGICAL TECHNOLOGY ANTÓNIO XAVIER

MOST MICRO-ITQB | **NAME** Molecular, Structural and Cellular Microbiology Unit
COORDINATOR Cláudio Soares
WEBSITE www.itqb.unl.pt/mostmicro

MOSTMICRO-ITQB aims to understand biological processes at the molecular, structural, cellular and population levels, with a focus on microbes important for human health, biotechnology and the environment. MOSMICRO- ITQB carries out internationally competitive research along three thematic lines: understanding the molecular mechanisms of biological processes, anti-infective strategies against microbial pathogens and microbial factories for Health and Sustainability. MOSTMICRO-ITQB hosts 34 research laboratories, organized in 10 Research Groups, plus the Science Communication, Funding & Innovation Group.

Green-it | **NAME** Bioresources4sustainability
COORDINATOR Maria Margarida Oliveira
WEBSITE www.itqb.unl.pt/green-it

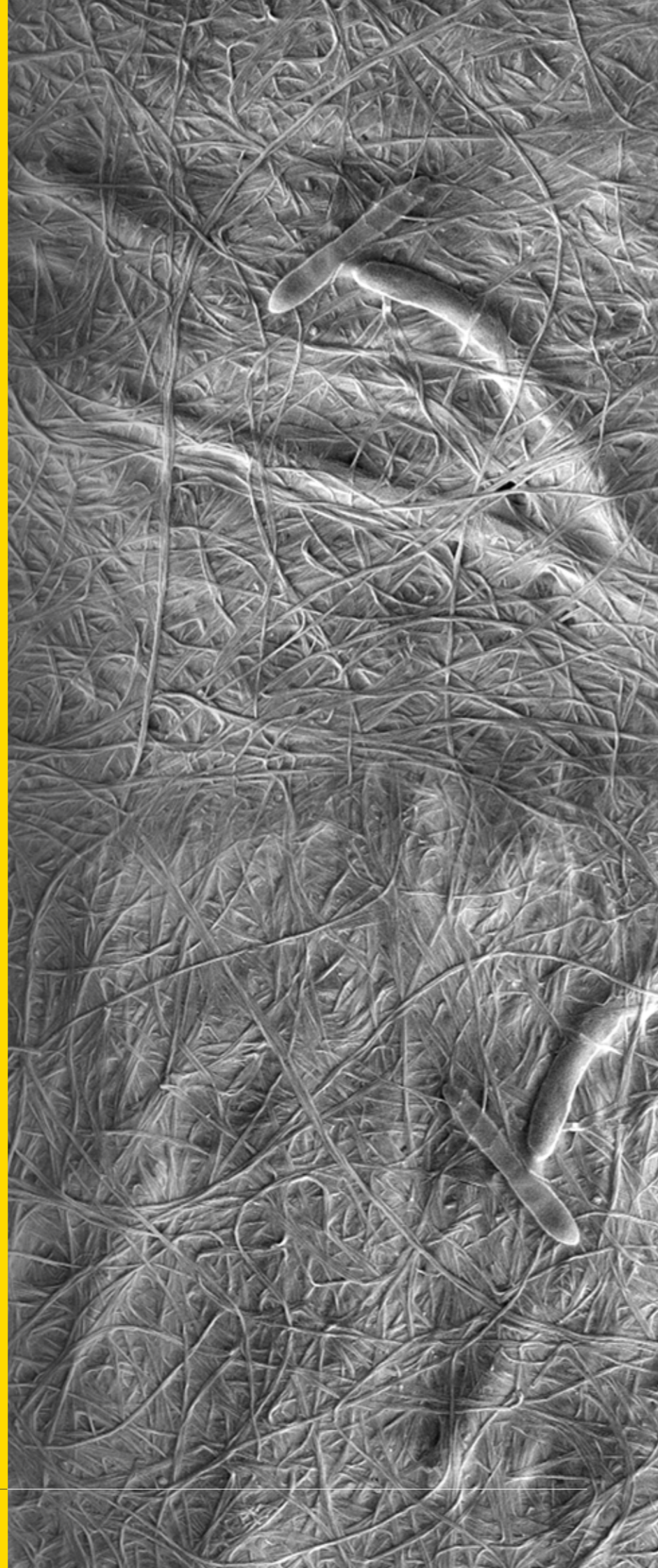
GREEN-IT addresses the challenge of ensuring food security and adequate resources for a growing human population, by deciphering the basic mechanisms of plant-environment interactions and translating knowledge into innovation for plant breeding, while guaranteeing environmental sustainability. GREEN-IT gathers researchers from five world-class institutes, ITQB NOVA, iBET, IGC and INIAV (all at Oeiras Campus), and INSA (in Lisbon), pursuing excellence in research, international cooperation, and education in plant sciences and agrobiotechnology applications.

NOVA NATIONAL SCHOOL OF PUBLIC HEALTH - CISP joined with CHRC.

8

CoLAB

COLLABORATIVE
LABORATORIES



VILA DO CONDE
COLAB4FOOD

MATOSINHOS
BIOREF

PORTO
NET4CO2

VILA NOVA DE GAIA
VORTEX

**OLIVEIRA
DO HOSPITAL**
ECOLAB

TORRES VEDRAS
SFCOLAB

LISBOA
VALUE4HEALTH

ALMADA
ALMASCIENCE

ELVAS
INNOVPLANTPROJECT

> **NAME**

CELLULOSE FOR SUSTAINABLE
SMART APPLICATIONS

> **ACRONYM**

ALMASCIENCE

> **COORDINATOR
OF THE CoLAB**

Carlos Jorge Silva

> **COORDINATOR
AT NOVA**

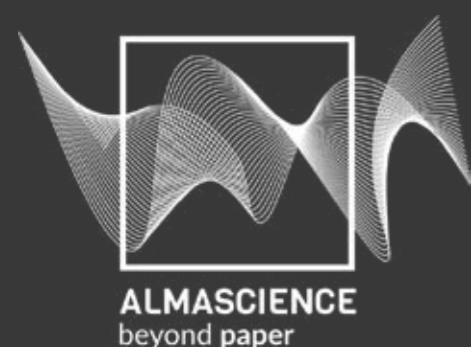
Elvira Fortunato

> **CONTACTS**

global@almascience.pt
+351 910 073 244

> **WEBSITE**

www.almascience.pt



Constituted as a Collaborative laboratory (CoLAB), ALMASCIENCE is an applied research organization focused on innovation, development and deployment of cellulose based smart and sustainable applications.

The combination of advanced functional materials and nanotechnology will result in new ecological and game-changing cellulose-based, printable multifunctional devices and systems. Therefore, ALMASCIENCE aims to deliver sustainable and universally accessible solutions by effectively enabling IoT in areas like: security, environment, health, brand protection, electronics, logistics, food or marketing.

Paper electronics holds a unique potential to bring intelligence into everyday objects and areas of our daily life such as radio-frequency identification (RFID), health diagnostics, logistics and inventory management, or smart labels and packaging.

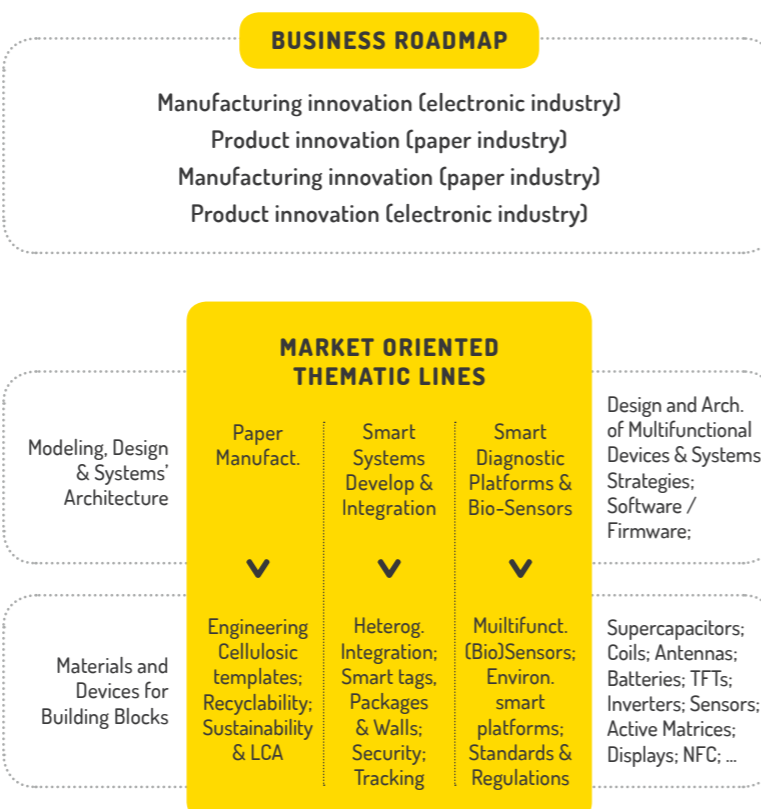
These new technologies offer new cost-saving solutions, energy-efficient processes and fully recyclable alternatives. Disposable electronics market segment, with a fully ecological and sustainable approach, will impact the IoT, and many emergent digital technologies. In addition, Point of Care smart diagnostic devices can replace current expensive diagnostic technologies by disposable and cost-effective counterparts, exploiting digital fabrication and functionalities on engineered paper substrates.

Objectives

ALMASCIENCE aims to establish in Portugal an integrated and innovative sustainable smart paper-based platform able to serve multi-sectors, with fully recyclable, eco-product-ranges, capturing the needs associated with the IoT.

The vision is to establish a brand-new and innovation driven link between:

- Research labs with outstanding track record at European level in the fields of advanced functional materials, and pioneers in promoting the area of transparent electronics and paper electronics;
- Paper and pulp producers, and new cellulose materials developers;
- End-users willing to revolutionize their market approach through ecological and sustainable solutions.



Principal/Strategic Activities

Technological and scientific founding associates:

TL1 – Paper manufacturing and modification

Focused on identifying and establishing new lignocellulosic based materials from natural or bacteria origin, according to the requirements of the demonstrators to be produced (porous or dense and compacted paper, transparent or not). Innovation challenges will include paper manufacturing for electronics and microfluidics either to paper industries and/or to the electronic sectors. Specific targets: interactive paper surfaces (e-posters, e-paper displays and touch sensors), smart packaging, smart home surfaces embedding RF antennas/ power management, documents security and paper-based bio-diagnostic tools.

TL2 – Smart systems development and integration

Development of electronic systems for interfacing, control and power management, including the establishment of self-sustainable energy sources, targeting final applications such as smart tags or packages, smart documents or interactive surfaces. Also will be developed systems integrations like hybrid assembly strategies.

TL3 – Smart diagnostics platforms and biosensors

Development of demonstrators for application in healthcare diagnostics sectors and environmental monitoring, including the integration of the sensing, fluidic and electronic components. The aim is to develop an industrially relevant smart Point of Care smart diagnostic for infection diseases and environmental hazards using paper as the main platform for a “sample in answer out” disposable device. This will include the verification of the toxicology, functional materials to be used and recyclability possibilities.

Transversal research and innovation thematic lines

TL4 – Modelling, design and systems' architecture

Defining test vehicles for each sub-system or building block, designed to be modular. “Functional blocks” will be developed, tested, optimised and then integrated in the final demonstration products. This line will also deal with the design of the demo systems, including subsystems selection and the best way to interconnect them. The activity in this thematic line will be of crucial in designing energy harvesting subsystems specially conceived to ultra-low power consumption, extremely relevant for the set of autonomous systems envisaged, as well as for the communication subsystems and protocols.

TL5 – Materials and devices for building blocks

Delivering functional materials to be used in the subsystems, that will include organic, inorganic and hybrid to be integrated as components in the set of devices (passive and active). The goal is to adapt them to be used in the formulation of low cost and roll-to roll/sheet-to-sheet technologies printable inks. These materials will be the basis for the future development of several subsystems such as passive and active elements, sensors (electrochemical, capacitive, resistive or catalytic), energy devices (batteries or supercapacitors), electronic devices (TFT, inverters...) or displays (electrochromic or luminescent ones).

Infrastructures and Facilities

Lisbon Office | Campus da Caparica, Caparica, Almada (the headquarters of FCT NOVA and Nova.id.FCT)

Aveiro Office | Quinta de S. Francisco, Rua José Estevão (EN 230-1), 3800-783 Eixo, Aveiro (the headquarters of RAIZ).

> **SCIENTIFIC AREAS**

- Paper manufacturing and modification
- Smart systems development and integration
- Smart diagnostics platforms and biosensors
- Modelling, design and systems' architecture
- Materials and devices for building blocks

> **STARTING DATE**

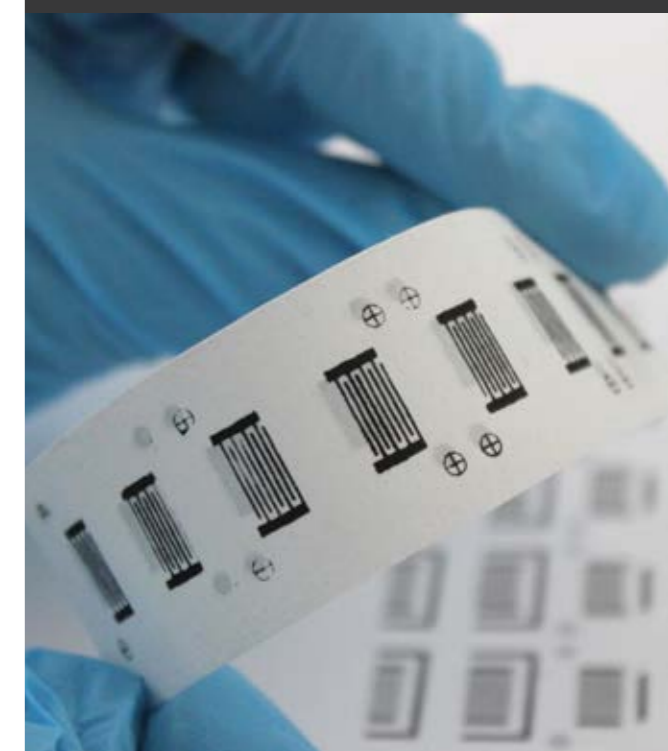
24TH MAY 2019

> **FUNDING AWARDED
FOR 5 YEARS**

5 000 000,00 €

> **TEAM/CONSORTIUM**

- NOVA id. FCT – FCT Association for Innovation and Development
- RAIZ – Forest and Paper Research Institute
- Fraunhofer Portugal Research
- NOVA University Lisbon
- The NAVIGATOR Company
- INCM – Portuguese Mint and Official Printing Office
- Clara Saúde



> NAME

COLLABORATIVE LABORATORY
FOR BIOREFINERIES

> ACRONYM

BIOREF

> COORDINATOR
OF THE CoLAB

Laboratório Nacional
de Energia e Geologia,
I.P. (LNEG)

> COORDINATOR
AT NOVA

Isabel Rocha

> CONTACTS

LJ. CTT, S MAMEDE DE INFESTA,
Apartado 1089, 4466-901
São Mamede de Infesta

geral@bioref-colab.pt
colabbioeref@lneg.pt

> WEBSITE

www.bioref-colab.pt

Multidisciplinary research, development and innovation are required to change the actual fossil-based economy paradigm, to design and implement new economies and markets, oriented for the sustainable use of biomass. Portugal is considerably behind other EU countries in this area without any significant private and public investment in sustainable uses of biomass for new value chains, e.g. biomethane, biohydrogen, advanced biofuels (e.g. cellulosic ethanol, diesel substitutes) or bio-based products that substitute others currently obtained from fossil resources. Collaborative Laboratory (CoLAB) for Research & Innovation on Biorefineries – BIOREF intends to be one of the driving forces to change the paradigm of economic development through a national strategy for biomass as a renewable resource. For this BIOREF aims to:

1. Promote Bioeconomy and Bioenergy creating highly qualified national human resources taking advantage of biomass as a national and abundant resource.
2. Use the previous and well established national and international associations, networks (EERA, BBI JU, ESEIA, ETIP Bioenergy, ART Fuels Forum, IEA, CYTED, EABA, AEBIOM, ePure) and links with financial institutions (FCT, H2020, P2020, ANI, FAI) to promote internationalisation and to facilitate high quality innovation transfer of knowledge to national industrial sectors to achieve the development of biorefineries in Portugal.
3. Promote a “market-driven” Research & Innovation Agenda related to the use of advanced technologies characterised by more sustainable and the low(est) carbon footprint by using different types of biomasses, especially residues as feedstocks for new processes and products.
4. Focus on applied research and development actions leading to implementation of energy-and bio-based product-oriented biorefineries.
5. Use of Key Performance Indicators (KPIs) focused on three pillars of sustainability (economic, social and environmental) to monitor the accomplishment of BIOREF Vision.

The recent publication of a Resolution of the Ministry Council of the Republic of Portugal (Resolução do Conselho de Ministros n.º 163/2017 of 31st of October 2017) about the establishment of the National Plan for the Promotion of Biorefineries – Horizon 2030 (PNPB) gives the necessary political endorsement to create a Portuguese Strategy for Biorefineries using endogenous and sustainable biomass. The PNPB is intending to promote the development of two main types of biorefineries, namely energy-and/or bio-based product-oriented biorefineries. This dual type of biorefineries is coherent with the international vision of development of biorefineries and with main strategies for biomass uses being described in:

- 1) the new Integrated Roadmap of SET-PLAN, in particular, the Action #8-Declaration of Intent on Strategic Targets for bioenergy and renewable fuels needed for suitable transport solution (energy-based biorefineries) and
- 2) the Strategic Innovation and Research Agenda of Bio-based Industries Consortium (BIC JU) and Innovating for Sustainable Growth: A Bioeconomy for Europe. The latter document is currently being revised by EC and the first revised version is expected to be released on 20th of March 2018.

The CoLAB for Research & Innovation on Biorefineries – BIOREF will be a market-oriented entity concentrating its activities on the development, exploitation, transfer, and/or selling rights of Intellectual Property of novel technologies, products and services. It will be done in a strong collaboration with BIOREF associates but oriented also on the national and international industrial biomass sector. Short-and long-term impact on national economy and jobs creation will be achieved by the scientific excellence operating in inspiring, innovative R&D&I environment. It will be done by creating new and enforcing the existing links with national and European stakeholders to identify

the challenges and needs for the deployment of sustainable (economic, environmental and social) biorefineries towards a low-carbon economy. Up to now, Portugal does not have any advanced biorefinery plant and the vision of BIOREF CoLAB is to change this reality in the 5-year (short-term impact) and 10-year (long-term impact) panoramas. It will take place within the entire biomass value chain, namely, promoting local markets for biomass, adding value to forestry owners and other biomass owners, increasing the overall Portuguese gross value-added through new products sales and exports and enhancing the energetic security of Portugal by reducing oil, coal and natural gas imports.

BIOMASS CATEGORIES

Forestry and Agriculture-based residues

Algae and Marine biomass

Domestic and Industrial residues



TECHNOLOGICAL ACTIVITIES

- Biomass fractionation pre-treatments
- Biochemical processing of biomass for biofuels and bio-based products
- (Bio)catalytic processing of biomass or biological intermediary products and CO₂ for fuels and bio-based products
- Fractioning/upgrading technologies for biogas, syngas and pyrolysis oils
- Integration of thermochemical and biochemical platforms and side streams valorisation
- Downstream processing for bio-based products and biofuels
- Electrochemical technologies for energy conversion and storage from biomass and others RES
- Pre-engineering biorefineries studies, including tech.-economic analysis, process integration and optimisation
- Sustainability assessment of new biorefineries value-chains, incl. LCA and LCC



PRODUCTS



Advanced Biofuels
(H₂, Biomethane,
Liquids)



Power, Heating
& Cooling



Bioproducts
and Biomaterials

> SCIENTIFIC AREAS

Biorefineries

Bioenergy

Bioproducts

> STARTING DATE

11ST APRIL 2018

> FUNDING AWARDED
FOR 5 YEARS

3 500 000,00 €

> TEAM/CONSORTIUM

Laboratório Nacional de Energia e
Geologia, I.P. (LNEG)

Instituto Superior Técnico (IST)

Univ. do Minho

Univ. NOVA de Lisboa

Univ. do Porto

Univ. de Aveiro

FCUL - Univ. de Lisboa

Instit. Politécnico de Portalegre (IPP)

Univ. de Trás-os-Montes e Alto Douro
(UTAD)

RAIZ - Instituto de Investigação da
Floresta e Papel

A4F - Algafuel, S.A.

BIODOUROGÁS - Produtora de Gás
Combustível Gás, S.A.

BLC3 EVOLUTION, Lda.

TRATOLIXO - Tratamento de Resíduos
Sólidos, E.I.M., S.A

SYSADVANCE - Sistemas de Engenharia
S.A.

PETROGAL S.A.

SOLVAY Portugal- produtos Químicos, S.A.

TAP-Transportes Aéreos Portugueses, S.A.

BIOTREND-Inovação e Engenharia em
Biotecnologia, S.A.

SILICOLIFE

> NAME

COLLABORATIVE LABORATORY FOR
INNOVATION IN THE FOOD INDUSTRY

> ACRONYM

CoLab4Food

> COORDINATOR
OF THE CoLAB

PortugalFoods

> COORDINATOR
AT NOVA

Susana Barreiros

> CONTACTS

Miguel Teixeira, Scientific &
Technology Director | Colab4Food
+351 936 268 137
miguel.teixeira@colab4food.com
Skype: live:miguelteixeira_

> WEBSITE

[www.portugalfoods.org/noticias/
portugalfoods/item/736-
colab4food-recursos-humanos](http://www.portugalfoods.org/noticias/portugalfoods/item/736-colab4food-recursos-humanos)

Structure

The collaborative laboratory Colab4Food has currently 15 institutional associate entities, having PortugalFoods, the Portuguese agri-food cluster, acting as the proponent institution. Colab4Food institutional associates are key players in the Portuguese food industry together with relevant non-business entities from the research and innovation (R&I) system.

The association Colab4Food has also a team of 16 highly qualified researchers with background and expertise in different fields from Food Science and Technology, Microbiology, Biochemistry and Engineering, among others. This research team uses uncommon sense to reject convention and put together science, passion, creativity and expertise to create novel and unique taste and food solutions, experiences and nutrition to our stakeholder's consumers by working together with the industry partners.

Together we aim at innovating first through a collaborative approach using the matrix expertise available in Portugal to strengthen scientifically and economically the food business.

Mission

The development of new and innovative processes, products and industrial value chains calls for the collaboration and integration of different innovation actors, including large enterprises and especially SMEs, across the European food sector towards the implementation of a joint vision. In particular, the Portuguese industry and academia operating in the food sector can be further interconnected to develop stronger synergies at scientific level to strengthen the food sector. Our purpose at the Colab4Food is to redefine the way we apply the most advanced scientific knowledge to help the food industry developing new, improved and sustainable processes and products that delight consumers and contribute to improving their health and nutrition. This will involve a joint effort for the collaborative development of research and innovation happening between the Portuguese food industry and non-business entities from the R&I system to optimize food solutions and technology transfer.

Through this process, Colab4Food will contribute to the sustainability and competitiveness of the Portuguese food sector, which should be completely integrated, interconnected, transparent, resilient, and efficient in the use of resources with a consumer centric approach, thereby contributing to reinforcing the economic importance of this industry in Portugal. Furthermore, we will actively contribute to promoting the internationalisation of the Portuguese food companies by identifying research funding opportunities and empowering this business with the latest technology tools.

From a corporate standpoint, Colab4Food aims at implementing itself as a reputed entity for research, innovation and technology in the Food, Nutrition and Health areas.



Innovating First



Objectives

Actively contribute to the employment and career development of highly qualified researchers of the scientific national system to push science into the food business.

Strengthen collaborative R&D activities together with an efficient technology transfer process into the food industry.

Develop innovative processes and transformational products that meet market demands and consumer needs.

Create high quality, nutritious and safe food products within a consumer centric approach to contribute for consumers health and wellbeing.

Promote the efficient and sustainable use of food raw materials including the valorisation of food waste products, thus allowing the implementation of a circular economy.

Principal/Strategic Activities

The strategic vision of the Colab4Food aims to promote a paradigm change in the collaboration framework between industry and academia working in food, nutrition and health related fields. Colab4Food will act as a process that flows from the business sector to the non-business entities of the research and innovation (R&I) system.

Strategic initiatives will include the collaborative development of:

- Sustainable and competitive food systems
- Healthy and safe foods
- Delivery of premium and authentic food
- Valorisation of food by products
- Fulfilling market trends and consumer choices
- Gaining national and international funding for state of the art science and extending the food network across Europe.

Infrastructures and Facilities

INIAV, Vairão Campus, Vila do Conde, Porto – Portugal (headquarters)



Figure 1. INIAV – Vairão

> SCIENTIFIC AREAS

Food safety and nutrition

Sustainability

Foods for health and well-being

> STARTING DATE

24TH APRIL 2019

> FUNDING AWARDED
FOR 5 YEARS

2 500 000,00 €

> TEAM/CONSORTIUM

Portugal Foods / Portuguese Agrofood
Cluster

INIAV – Instituto Nacional de
Investigação Agrária e Veterinária

Requimte – Rede de Química e de
Tecnologia

Universidade do Porto

Universidade de Aveiro

Universidade do Minho

Universidade de Lisboa – Instituto
Superior de Agronomia

Universidade Católica Portuguesa

Universidade de Trás-os-Montes e Alto
Douro

Frulact

Sumol+Compal Marcas, S.A.

Grupo Primor, S.A.

Sense Test – Sociedade

Superbock Bebidas, S.A.

Mendes Gonçalves, S.A.

> NAME

COLLABORATIVE LABORATORY
TOWARDS CIRCULAR ECONOMY

> ACRONYM

eCoLAB

> COORDINATOR
OF THE CoLAB

João Nunes

> COORDINATOR
AT NOVA

João Paulo Crespo

> CONTACT

Incubadora | BLC3
238 641 059
info@eco-lab.pt

> WEBSITE

www.eco-lab.pt

Collaborative Laboratory Towards Circular Economy



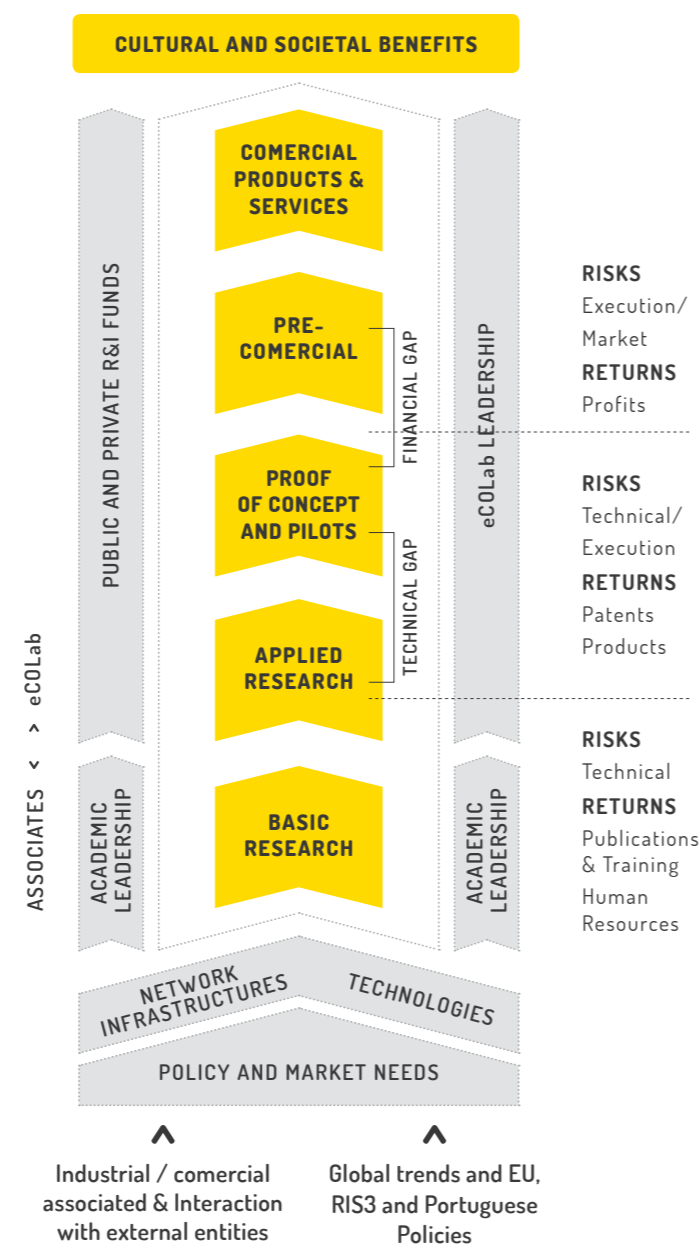
Structure & Mission

The eCoLab aims at bringing together key academic and industrial players in some of the most important sectors of the Portuguese Economy, to promote a change in paradigm from a Linear to a Circular Economy (CE) setup. This shift is essential to move from a non-sustainable model of development scenario of “take, make and dispose”, leading to the inevitable shortage/dwindling of resources, and to an oversized human environmental footprint that cannot be sustained for future generations and that ultimately will lead to nations security/survival problems, towards a restorative and regenerative sustainable model of development. While pursuing this goal, eCoLab aims at becoming a National and European leading player in R&D&I in the CE field.

Objectives

ECOLab has as its main purpose the exercise of activities on three technological platforms – (1) industrial biotechnology, (2) sustainable separation processes and green chemistry and (3) ecodesign – and aims to have an impact on the value chains of the forest, agribusiness, urban waste, water, industrial manufacturing, construction and services.

INNOVATION PROCESS: ASSOCIATES AND eCoLab



Principal/Strategic Activities

Technology Commercialization:

- Creating spin-outs
- Licensing technology
- Continuous support after technological licensing
- Design and support scale up industrialisation IP landscaping and freedom to operate

Training, Mentoring & Services:

- Advanced training programs
- Managing innovation
- Hi-tech internationalisation
- Business, entrepreneur and start up mentoring
- Search for funds
- Promotion of participation in international calls with high competitiveness
- Promotion of participation in international networks
- Design decision support policies

Innovation & Development Research:

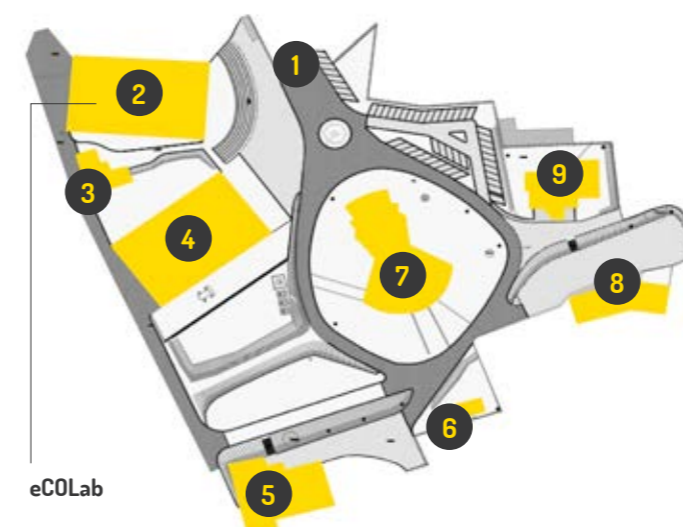
- Oriented research programs and activities
- Innovation ecosystem
- Access technologic infrastructures Collaborative network
- Benchmarking studies
- Business planning
- Higher education strategy

Technology Transfer & KEC Management

- Market analysis and commercial strategy
- Scientific dissemination and credible brand
- IP policy advice
- Establishing and supporting TTOs
- Incubator development and support
- Finding licensees and sales partners
- Patent strategy

Infrastructures and Facilities

The eCoLAB is located at BLC3 Incubator, Oliveira do Hospital, Coimbra - Portugal. Its main infrastructures are the following:



> SCIENTIFIC AREAS

Industrial Biotechnology
Sustainable Separation Process
and Green Chemistry
EcoDesign

> STARTING DATE

26TH JUNE 2019

> FUNDING AWARDED
FOR 5 YEARS

4 500 000,00 €

> TEAM/CONSORTIUM

BLC3 – Campus de Tecnologia e Inovação
The NAVIGATOR Company
RAIZ – Forest and Paper Research Institute
TMG – Tecidos para Vestuário e Decoração
Lipor – Intermunicipal Waste Management Service of Greater Porto
Mota-Engil
AQUITEX
ISO – Welding and Quality Institute
LNEG – National Laboratory of Energy and Geology
UA –University of Aveiro
UC –University of Coimbra
UCP –The Catholic University of Portugal
UM – University of Minho
UNL – NOVA University Lisbon
UP – University of Porto

Figure 1. Infrastructures and Facilities:

1. Entrance
2. 4A – Business Centre
3. 1B – R&D Centre Plant BioTec
4. 1A – R&D Centre Industrial Biotechnology
5. 4B – FabLab Agrofood
6. Internal Power Connction to Electrical Grid
7. Future Multi-uses
8. Centre for Support to Projects and Innovative Ideas, CSPI
9. Incubator | BLC3

> NAME

INNOVATIVE BIO-BASED
SOLUTIONS FOR CROP
PROTECTION

> ACRONYM

InnovPlantProtect

> COORDINATOR
OF THE CoLAB

M. Margarida Oliveira
Scientific Coordinator

> COORDINATOR
AT NOVA

Isabel Rocha
President of the Administrative
Council of InnovPlantProtect
Association

> CONTACT

innovplantprotect@itqb.unl.pt

> WEBSITE

www.itqb.unl.pt/research/colab/
innovplantprotect



The **InnovPlantProtect CoLAB**, promoted by **NOVA University Lisbon**, is a joint effort of four Organic Units of NOVA (ITQB NOVA, FCT NOVA, NOVA IMS and Nova SBE), INIAV, the Municipality of Elvas, two major multinational companies (Bayer CropScience, Syngenta Crop Protection), an SME (Fertiprado), an **agro-biotech research Centre in Beja (CEBAL)**, four farmer/industrial Associations covering a wide variety of plants and **Évora University**. The private non-profit InnovPlantProtect Association was constituted in January 2019, and the title of CoLAB was attributed by the Portuguese Foundation for Science and Technology (FCT, I.P.).

About **40% of global crop production is lost annually** due to pests and diseases. The scenario will worsen when currently used phyto-pharmaceuticals are removed from the market, according to EU plans. Changing climate is further restricting plant productivity and affecting the migration and severity of pests and diseases. **InnovPlantProtect mission is to create solutions to address these challenges.**

InnovPlantProtect Collaborative Laboratory (CoLAB), will develop **new and effective pest/disease protection solutions for specific targets of Mediterranean interest** (among cereals, fruit trees or horticultural crops) with associated Intellectual Property for licensing. **Risk and pesticide application models and methods for pest monitoring/diagnosis**, including early detection and forecasting, will be developed and implemented for the specific targets. From a global point-of-view, the most important objective of InnovPlantProtect is the innovation in a field of enormous agronomic, economic and social impact.

To achieve its main goal, InnovPlantProtect CoLAB will target specific objectives, corresponding to seven differentiated areas, in order to:

- Produce new nucleic acid-based biopesticides
- Produce new protein/oligopeptide-based biopesticides
- Select/add resistances against pest/diseases in specific crops
- Develop new formulations and matrices for agricultural applications
- Develop new methods to diagnose, screen and model pest/disease emergence and dissemination
- Analyse and manage metadata for the identification of specific targets
- Assess pest risks and suggest pest risk management

These objectives will be targeted within five complementary Departments, as shown in Figure 1.

By combining emerging molecular, monitoring and modelling techniques with the increasing knowledge of genomics, new solutions will be designed to provide targeted protection in specific crops, reducing losses and contributing for increased yields in a frame of environmental responsibility. In addition to the **production of new bio-pesticides**, the CoLAB will implement a competence unit for risk modelling based on collected data for pest monitoring and diagnosis, using a variety of technologies including cyber-physical systems, robotics/drones, sensors, and artificial intelligence. The CoLAB will also develop new formulations and matrices for the controlled application and delivery of biopesticides.

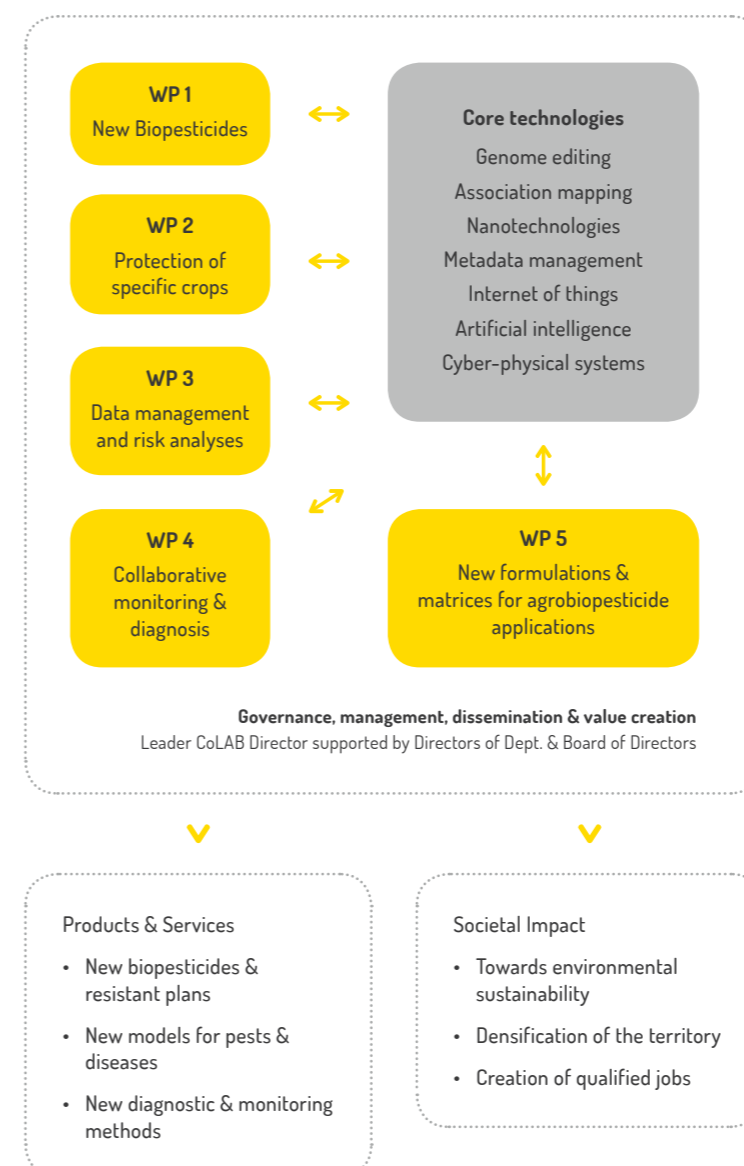
A major asset from which InnovPlantProtect will benefit is the broad and well-supported plant science expertise available at **GREEN-IT**, and the robotics, artificial intelligence, computing and modelling expertise of **NOVA LINC**, **CTS** and **MagIC**. The CoLAB will benefit from building on existing strengths, such as the available expertise on genomic and biotech tools, and on plant-pathogen interactions, as well as on the on-going research addressing the molecular and genetic basis of specific plant-pathogen interactions. By incorporating

fundamental and applied science, and also investing in translational activities, InnovPlantProtect will be able to develop new innovative crop protection strategies, breed more resistant plant varieties, and design better-integrated pest management systems.

Aiming to start as a pioneer private non-profit association, ground on its founder institutions and with well-defined targets, InnovPlantProtect envisions to further expand collaborations at national and international level not only to validate its products, ensure efficacy and guarantee environmental protection, but also to broaden the range of target crops and threats, increasing its contribution for a more rational and sustainable world.

The CoLAB will be located at the **Campus of the INIAV breeding centre in Elvas** (Figure 2), in the Portuguese region of Alentejo. The setting in Elvas will help to densify the country, while motivating and revitalizing the Elvas breeding centre and strengthening links with local bodies. It will help to establish the region and Alentejo as a breeding ground for research, providing qualified jobs, helping to attract investors, and also strengthening connections with a local school of higher education, the Polytechnic Institute of Portalegre (IPP).

InnovPlantProtect will attract scientists and students (some to be hired through the CoLAB), as well as advisors and industry. Altogether, this CoLAB will help to make Elvas region and Alentejo recognized and dynamic areas that support research, provide employment for young people and help to attract investors and specialized Men-power.



> SCIENTIFIC AREAS

Plant breeding
Innovative bio-pesticides
Cyber-physical systems
Sensors
Robotics/drones
Artificial intelligence
Formulations
Matrices

> STARTING DATE

1ST JANUARY 2020

> FUNDING AWARDED
FOR 5 YEARS

4 800 000,00 €

> TEAM/CONSORTIUM

Coordinator

UNL

Participants

INIAV

Elvas Municipality

Bayer Crop Science

Syngenta Crop Protection

Fertiprado

Anpromis

Casa do Arroz

CEBAL

ANPOC

FNOP

Évora University (joined after
the Association was constituted)

Figure 1. Simplified fluxogram of InnovPlantProtect CoLAB defining the Core technologies to be employed, the Workpackages to implement and respective institutional leaders and the types of products/services and social impact to generate.

CoLAB NET4CO2

> NAME

NETWORK FOR A SUSTAINABLE
CO2 ECONOMY

> ACRONYM

NET4CO2

> COORDINATOR OF THE CoLAB

Carlos Martins Andrade

> COORDINATOR AT NOVA

José Paulo Mota

> CONTACT

UPTEC Asprela II
Science and Technology Park
of University of Porto
+351 220 731 349
info@net4co2.pt

> WEBSITE

www.net4co2.pt

The Collaborative Laboratory NET4CO2, a private nonprofit organization, is a network of R&D competences and technologies with the goal of creating new processes and products that make a significant contribution to the CO2 sustainable circular economy.

Our current lifestyle is highly dependent on non-renewable energy sources, such as petroleum, natural gas or coal. Obtaining energy from these fuels releases a significant number of particles and increases the amount CO2 in the atmosphere. The rate at which CO2 emissions increase is faster than the Earth's ability to adapt. The consequences are becoming noticeable with the increasing frequency of extreme natural phenomena and the destruction of ecosystems.

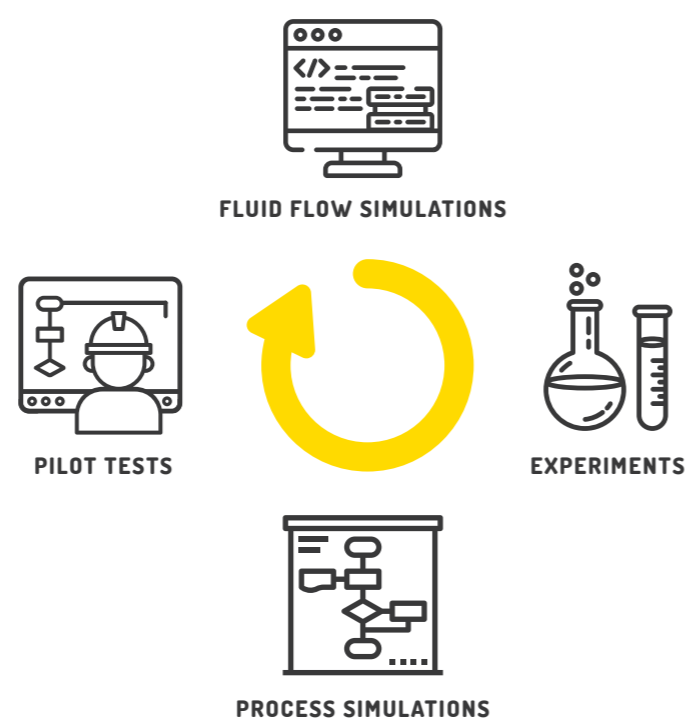
NET4CO2 aims to mitigate these trends without compromising the quality of our lifestyle. To this end, technical solutions are being developed on two main fronts:

- Safe, efficient, and profitable CO2 capture and separation;
- Competitive production of alternative fuels: synthetic fuels, which provide a route for CO2 and CH4 reutilization, and hydrogen, which produces zero CO2 emissions.

Mission & Objectives

The NET4CO2 mission is to align different entities for the development of processes and products that provide competitive solutions for CO2 capture, separation and valorisation. Moreover, as a Collaborative Laboratory (CoLAB), the NET4CO2 nonprofit foundation has the following long-term goals:

- To further strengthen and explore the established synergies between industry, universities, and the scientific community;
- To attract and retain scientific human resources and create qualified employment, particularly of young graduates, by enabling them to develop their knowledge within a sustainable working perspective and in an innovation-focused effort;
- To develop new Portuguese-based technologies to foster the evolution of the energy mix of the future in a sustainable global environment.



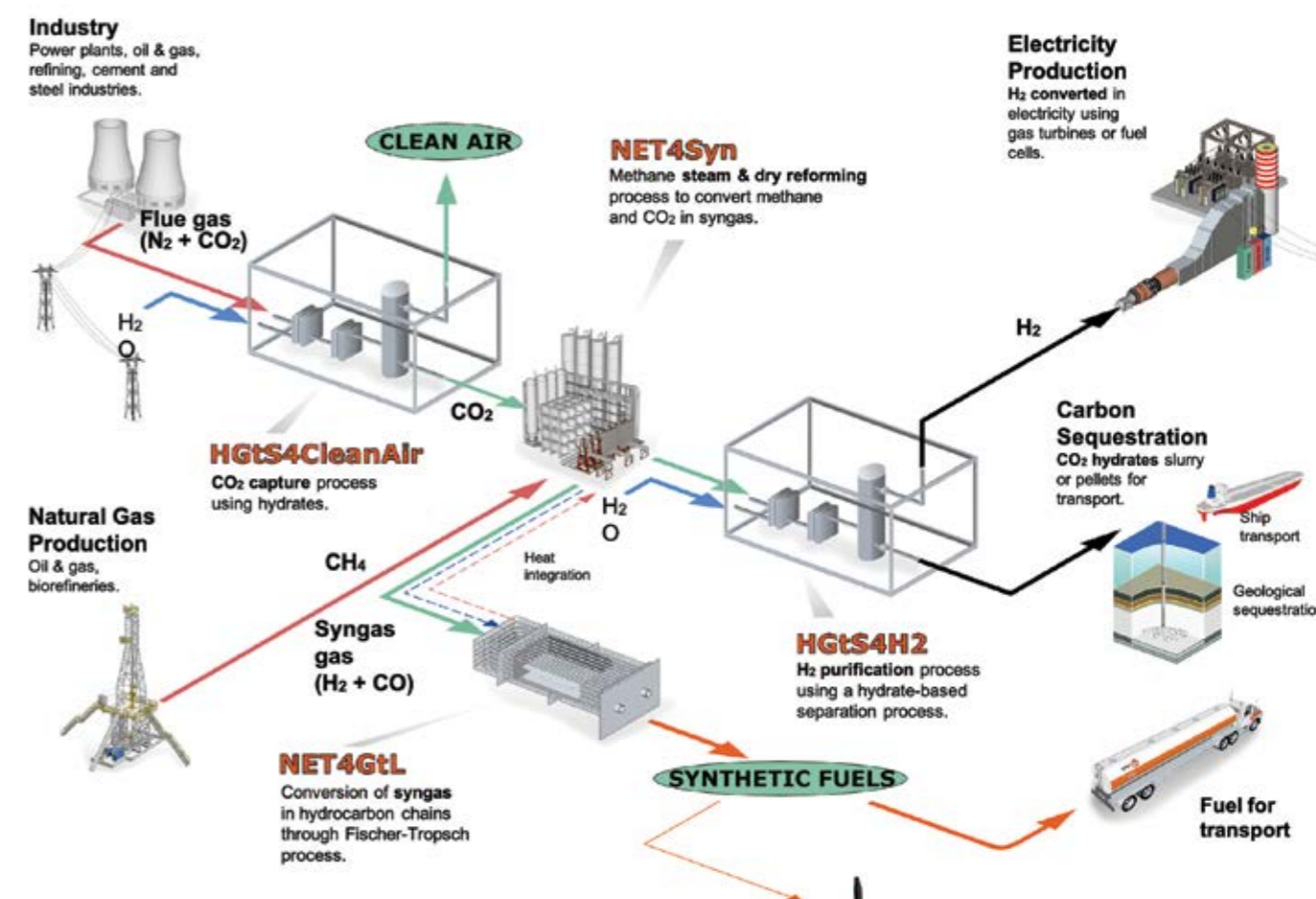
Principal/Strategic Activities

The NET4CO2 strategy to promote a CO2 circular economy has two complementary objectives. Within these objectives, key-process routes are defined for which technical solutions will be proposed. The two main objectives are:

1) To offer to CO2 industrial producers a more efficient and cost-effective alternative technology to Carbon Capture and Storage (CCS), an example of which is the continuous production of gas hydrates as a proposed route for CCS.

2) To develop processes that add value to captured greenhouse gases (GHGs). For example, synthetic fuels produced continuously from syngas (CO/CO2 e H2) lead to a significantly cleaner combustion than that obtained from conventional fossil fuels, minimizing the emission of NOX, SOX and particulate matter. The Fischer-Tropsch (FT) process is a Gas-to-Liquid process wherein synthesis gas (or syngas) is converted into liquid hydrocarbons, i.e. synthetic fuel. NET4CO2 aims to develop reactor designs for both syngas production and FT process, which are feasible at small scale and economically competitive with the existing large-scale units, which use large fixed or fluidized bed reactors.

We rely on intensive use of fluid flow modelling, process integration tools, and experiments at lab and pilot scale to address the variety of challenges inherent to the different technologies. Computational Fluid Dynamics (CFD), Computer Aided Design (CAD), process simulators, and top characterization and microfabrication techniques and equipment will be synchronized to create innovative and disruptive technology.



> SCIENTIFIC AREAS

Carbon dioxide circular economy
Carbon dioxide valorisation

> STARTING DATE

14TH MARCH 2019

> FUNDING AWARDED FOR 5 YEARS

1 650 000,00 €

> TEAM/CONSORTIUM

Galp Energia, SA
IST - Instituto Superior Técnico
REQUIMTE - Rede de Química e
Tecnologia - Associação
INL - International Iberian
Nanotechnology Laboratory
Change Partners, SCR, AS

> NAME

SMART FARM COLAB

> ACRONYM

SFCOLAB

> COORDINATOR
OF THE CoLAB

José Barata

> COORDINATOR
AT NOVA

José Barata

> CONTACT

Rua Cândido dos Reis nº1
Espaço SFCOLAB
2560 – 312 Torres Vedras
+351 918 77 33 82



**SMART FARM
COLAB**

LABORATÓRIO COLABORATIVO
PARA A INOVAÇÃO DIGITAL
NA AGRICULTURA

Structure

The SFCOLAB is currently composed of 7 companies, 4 universities, 1 research centre, 1 municipality, 1 vocational school, and 1 non-profit association.

The social bodies are:

General Assembly

- President – Stagric, Lda
- Vice-President – Adega Cooperativa de São Mamede da Ventosa, CRL
- Secretary – SGS Portugal – Sociedade Geral de Superintendência, SA

Board

- President – Município de Torres Vedras
- Vice-President – Tomix – Indústria de Equipamentos Agrícolas e Industriais, Limitada
- Treasurer – COTHN | Centro Operativo e Tecnológico Hortofrutícola Nacional
- Member of the Board – Universidade Nova de Lisboa – Faculdade de Ciências e Tecnologia
- Member of the Board – Instituto Nacional de Investigação Agrária e Veterinária, I.P

Fiscal Council

- President – Quinta do Pinto – Sociedade Comercial e Agrícola, S.A
- Member of the Fiscal Council – Optimizeplanet, Lda
- Member of the Fiscal Council – Associação Para a Valorização Agrária – AVA

Mission

SFCOLAB intends to become a European Reference in Digital and Sustainable Agriculture. The Strategic Vision is to generate integrative cutting-edge high-tech solutions into the horticulture-viticulture-fruticulture production sectors.

For that it will generate knowledge and solutions of advanced technological level in the wine, fruit and horticultural sectors, able to respond to the fundamental issues of the economy of the territory in the national context and with international scalability. The SFCOLAB is focused on sustainable production strategies, integrating resources use efficiency innovative techniques, digital and real-time monitoring systems with a high-tech farming management. A global strategy that aims to answer to key regional questions and global issues raised by the sector.

SFCOLAB addresses the current challenges of climate change, farm digitalization and circular economy. A user-friendly SMART FARM System.

Objectives

The SFCOLAB entire vision establishes a global set of Goals that aims to answer key regional questions and global issues raised by the producers, namely:

1. Direct substantial efforts to increase the use of and derive value from scientific results in Digital Agriculture domain in innovative solutions for the benefit of society, promoting an effective digital transition.
2. Drive and stimulate structured effective and trusted, long-lasting connections between science and horticulture, viticulture and fruticulture Sectors in Portugal West Region, thought hands-on approach with solid theory, in order to stimulate a resilient and competitive local business economy.
3. Increase production information thought real-time data and access to information for better and faster decision by farmers, accurate farm and field evaluation, to help farmers plan and predict future scenarios.
4. Contribute to a more efficient and sustainable use of resources, especially water, and to predict /model the impacts of drought and the climate change adaptation strategies on hydrological systems.
5. Introducing Innovative Techniques for the Efficient Use of Resources
6. Facing the challenges posed by Climate Change, Digitization, and Circular

Economy in a context of small and medium-sized agricultural units

7. Promote a sustainable and integrated urban development, based on Urban Agenda for the European Union, fostering coherence between urban matters and territorial cohesion, providing citizen living in west region an attractive place to work, as well as attract and establish future business.
8. Promoting job and skills in local economy, envisioning prosperity and lowering unemployment, attracting and keeping enterprises; creating an engaging ecosystem of new business; producing and consuming locally; supporting new ways of working and ensuring that skills meet the needs.

Principal/Strategic Activities

The SFCOLAB main activities are divided in 5 WPs.

WP1 – SMART USE Aims to develop a Sustainable resource Management framework in Real Time, integrating a precise maximization of key resources usage efficiency, towards neutral carbon and zero waste farming systems resilient to climate changes. In this framework assesses the main constraints related to plant responses to environmental stress, characterizes phytosanitary parameters linked to resources and co-resources as well as the identification of waste production products on the fruti-, horti- production systems in the Portuguese west region. Additionally, considers the development of High-throughput plant phenotyping and the implementation of bio-fertilizers and soil protection measures for sustainable farming systems.

WP2 – SMART EQUIPMENT Aims to develop SMART Intelligent Farm Machinery to support precision soil preparation, seeding, crop management (fertilization, crop protection, and irrigation), and harvesting. Accordingly, methodology to be used integrates, SMART Farming Robots – Unmanned Aerial Vehicles (UAV) and Unmanned Ground Vehicles (Autonomous Tractors), following a multimodal perception system, advanced navigation and autonomous mission. Interconnecting multiple autonomous systems to improve quality and efficiency. Besides, develops SMART cognitive cyber physical tools, as well as an active shared perception for SMART agriculture cyber physical devices, also considering human robot interaction for agricultural systems.

WP3 – SMART CONTROL & MONITORING Aims to research and develop multi-modal data collection, merging and integration systems, and support farm operations decisions. Accordingly, considers the build-up of collaborative farming ecosystem, implicating SMART monitoring, remote sensing (satellites and UAVs), local sensing (IoT/cognitive cyber physical), data analytics and tele-communications.

WP4 – SMART PRODUCT Aims to maximize the added value and potentiate the National generated horticulture, fruticulture and viticulture products accordingly to the present paradigm for sustainable farming systems and consumers, being therefore cantered in the valorisation of sensorial attributes, linking environmental conditioning, bio-control, shelf life and product traceability & certification of origin.

WP5 – SMART DECISION SYSTEM Aims to develop an ecosystem of applications to support the decision-making process of the stakeholders in the agri-food sector of west region, that includes the production areas of horticulture, fruticulture and viticulture. Thus, it deals with interoperability and integration platforms, further considering common domain ontologies, multimodal human computer interaction, forecasting tools, and decision support and optimisation tools.

Infrastructures and Facilities

Temporarily, the SFCOLAB is currently located in the INIAV building in Dois Portos, near Torres Vedras. After the renewal of the former facilities of Vineyard and Wine Institute (IVV), located in the centre of Torres Vedras, the SFCOLAB will move there. The goal is to boost a sustainable and efficient urban mobility through public transport, soft mobility (walking, cycling, public space) and an efficient transport with good internal (local) and external (regional) connectivity.

> SCIENTIFIC AREAS

Agricultural Sciences
Robotics
Computer Science
Artificial Intelligence
Electrical and Electronics Engineering
Environment Engineering
Biology

> STARTING DATE

24TH APRIL 2019> FUNDING AWARDED
FOR 5 YEARS

2 400 000,00 €

> TEAM/CONSORTIUM

Câmara Municipal de Torres Vedras
FCT-UNL
FC-UL
INIAV
Instituto Politécnico de Leiria
ISCTE
Escola Profissional Agrícola Fernando Barros Leal
Adega São Mamede da Ventosa
COTHN – Centro Operativo e Tecnológico Hortofrutícola Nacional
Luís Vicente
Optimize Planet
Quinta do Pinto
STAGRIC
SGS
TOMIX

> NAME

VALUE FOR HEALTH COLAB

> ACRONYM

VOH.CoLAB

> COORDINATOR
OF THE CoLAB

Ana Rita Londral

> COORDINATOR
AT NOVA

José Fragata

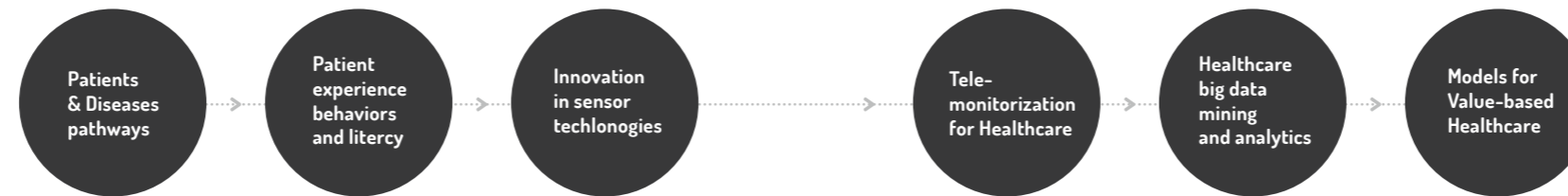
> CONTACTS

jigfragata@unl.pt

ana.londral@vohcolab.org

> WEBSITE

www.vohcolab.org



Value for Health CoLAB (VOH.CoLAB) is a non-profit private organization whose mission is to help people and organizations, worldwide, to measure value in Health, empowering everyone to take the right decisions. Since November 2018, we own the "Collaborative Laboratory" title, awarded by the Portuguese Foundation for Science and Technology (FCT).

Our multidisciplinary founding partners, NOVA University Lisbon, José de Mello Saúde, Vodafone Portugal and Fraunhofer Portugal, have centralized competencies and resources to accelerate the fundamental restructuring of Healthcare delivery towards a paradigm shift to Value-Based Healthcare and Patient Empowerment.

By resorting to digital innovation, we aim at supporting realistic in-the-field measurement of health-related outcomes, analyzing the costs associated to reach those outcomes and creating a shared understanding of value in Health among healthcare stakeholders (including the citizen).

To achieve these goals, VOH.CoLAB is engaging people and organizations to develop processes that effectively measure value in Health and help guiding the decision-making. By combining both research and service delivery, our team is modeling valuable health pathways throughout the full cycle of care with the help of:

- Scientifically validated indicators for measurement of clinical, patient-reported and socioeconomic outcomes, as well as associated costs;
- Citizens, to shape priorities, bring new ideas into the development of new tools for management of their health and engage them in treatments and good choices in Health;
- Providers, to accurately assess value and monitor progress.

Given our vision of transferring knowledge from academia to society, transdisciplinarity and digital transformation are the main disruptive forces, which motivate us to achieve valuable results for the Healthcare market and society, in general.



Therefore, the VOH.CoLAB's team gathers multidisciplinary skills, from Data Science and Digital Health to Medicine and Health Literacy. As key activities, it is relevant to point out the following:

- We digitalize to create effective mechanisms that allow the extraction of value that is important to improve health-related outcomes;
- We characterize a person's health journey to define parameters such as health status, clinical data, socio-demographic characteristics, citizen's health perception and lifestyle, to embrace social dynamics as a driver to change health-related behaviors;
- We measure value, defining it through three components: a sustainable evaluation of health-related outcomes, the perceived quality of healthcare by both citizens and providers and the costs associated to reach those outcomes.

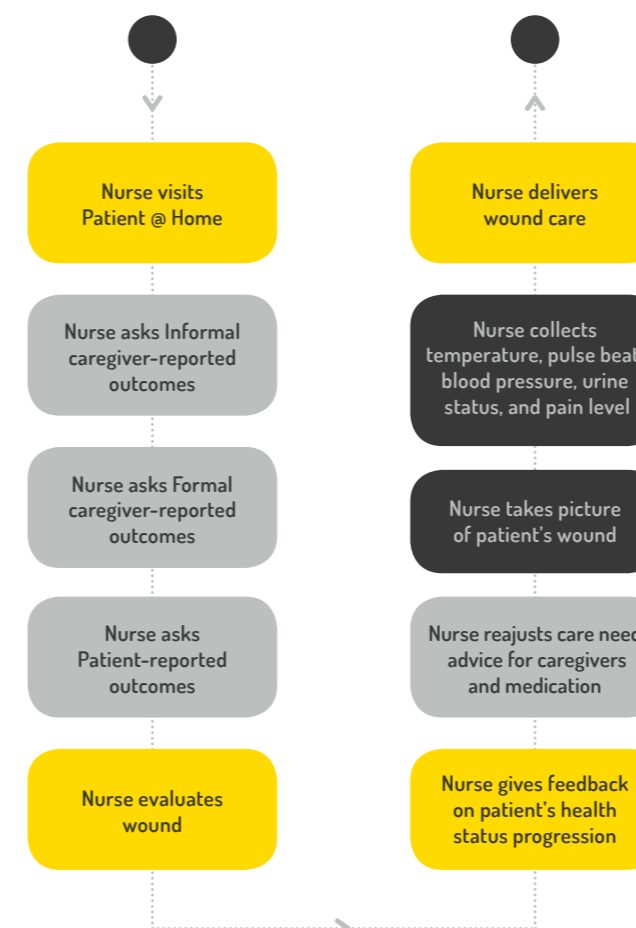
Our CoLAB is located at CEDOC, Yellow Building, at NOVA Medical School (Lisbon, Portugal).

CUF Home Care for Elderly People and Post-Surgery Patient

How IoT devices can help nurses deliver BETTER care?

Start home care service

End home care service



> SCIENTIFIC AREAS

Data Science
Digital Health
Medicine
Health Economics
Linguistics
Social Sciences

> STARTING DATE

23RD JANUARY 2019

> FUNDING AWARDED
FOR 5 YEARS

1 500 000,00

> TEAM/CONSORTIUM

Coordinator

UNL

Participants

José de Mello Saúde,
Vodafone Portugal,
Fraunhofer Portugal

NURSE Task performed by nurse

NURSE + IOT Task currently being performed by nurse, but which will be complemented by IoT devices

IOT Task currently being performed by nurse, but which will be automatized through IoT devices

> NAME

COLLABORATIVE LABORATORY
ON CYBER PHYSICAL SYSTEMS
AND CYBER SECURITY

> ACRONYM

VORTEX-CoLab

> COORDINATOR
OF THE CoLAB

Rodrigo Maia
CTO, Altran Portugal

> COORDINATOR
AT NOVA

Luís Caires

> CONTACT

vortex@vortex-colab.com

> WEBSITE

www.vortex-colab.com

VORTEX mission is to bridge the innovation gap between academia and business to accelerate the launch of cutting-edge cyber-physical systems and cybersecurity solutions that have a meaningful impact in industry and society. Our purpose is to bring industry and academia in a single vortex to quickly transfer cutting-edge research into tangible solutions in the areas of Cyberphysical Systems and Cybersecurity.

The technology cycles have become shorter and shorter in the past years, demanding new approaches to smooth the process between a new discovery in the research centers and its application in new industry products.

There is a gap between academia and the market, causing slowness in the introduction of state of the art research into actionable solutions.

Our purpose is to quickly translate cutting-edge research into tangible cyber-physical products, providing a competitive advantage to clients who want the most advanced solutions with reliability, correctness, and in real-time.

VORTEX combines the deep technical knowledge of the five founding member's institutions – Altran Portugal, CISTER, NOVA LINCS, INESC-TEC, Beta-I – in Software Engineering, Distributed Systems, Cryptography, Information Security, Real-Time & Embedded Computing Systems with solid innovation and acceleration methodologies. Our application domains include automotive, telecom, medical devices, aerospace and energy.



Figure 1. Partners.

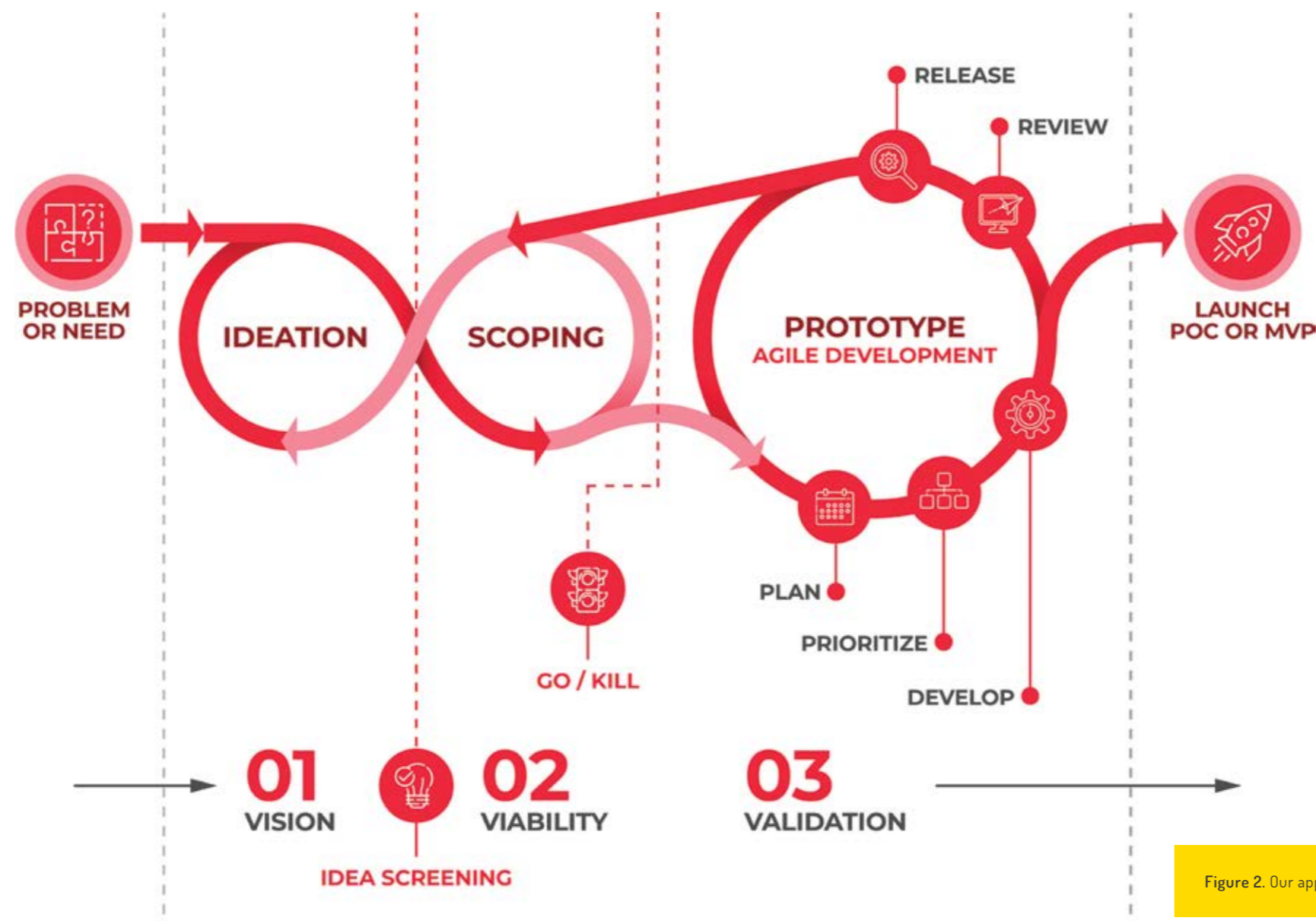


Figure 2. Our approach.

> SCIENTIFIC AREAS

Computer Science

> STARTING DATE

21ST FEBRURAY 2019

> FUNDING AWARDED
FOR 5 YEARS

2 600 000,00 €

> TEAM/CONSORTIUM

Coordinator

Altran Portugal

Participants

CISTER

NOVA LINCS

INESC-TEC (HASLab)

Beta-i

9

**NOVA
TALENT**
ERC GRANTEES

NOVA TALENT – ERC GRANTEE
ANA CECÍLIA ROQUE

- > **NAME PRINCIPAL INVESTIGATOR**
ANA CECÍLIA AFONSO ROQUE
- > **HOSTING INSTITUTION**
NOVA id.FCT
- > **STARTING DATE**
1ST DECEMBER 2015
- > **FUNDING AWARDED**
1 500 000. 00€
- > **WEBSITE**
sites.fct.unl.pt/biomolecular_eng/pages/scent

PROJECT TITLE
HYBRID GELS FOR RAPID MICROBIAL DETECTION

PROJECT ACRONYM
SCENT

- SCIENTIFIC AREAS**
- Artificial olfaction
 - Bioengineering
 - Self-assembly
 - Electronic nose
 - Advanced functional materials

BRIEF DESCRIPTION

Antimicrobial resistant bacteria are a global threat spreading at an alarming pace. They cause over 25,000 annual deaths in the EU, and represent an economic burden exceeding €1.5 billion a year. Current methods for microbial detection in clinical settings take about 24-36 h, but for slow-growing bacteria, as those causing tuberculosis, the process can take more than a week. Early-detection and confinement of the infected individuals are the only ways to provide adequate therapy and control infection spread. Thus, tools for rapid identification of bacterial infections are greatly needed. The analysis of microbial volatile metabolites is, thus, a burgeoning area in non-invasive and fast diagnostics.

Electronic noses (e-noses) are devices used for gas and volatiles sensing. These devices are able to distinguish samples by “smelling”, conceptually mimicking the biological olfactory system in humans and other animals.

PROJECT HIGHLIGHTS

> **PUBLICATIONS**

- 6
- Hussain et al, 2017. **Advanced Functional Materials**, 1700803:1–9
 - Palma et al, 2018. **Scientific Reports**, 8: 3360
 - Esteves et al, 2019. **Materials Today Bio**, 1:100002

> **AWARDS**

- 3
- Tribute to Women in Science**
100 Influential Portuguese Women Scientists 2016 (to Cecília Roque)
 - Startup Pirates**
Hardware Edition 2015 (3rd prize for best business idea)

> **PRESS RELEASES**

- 1
- “Intelligent gelatin: an engineered material for smelling” released on the 17th of April 2020

> **PRESENCE IN THE MEDIA**

- 11
- 10 news published in Portuguese mainstream media.
 - One episode of **90 Segundos de Ciência** radio program.

> **PATENTS**

- R 2

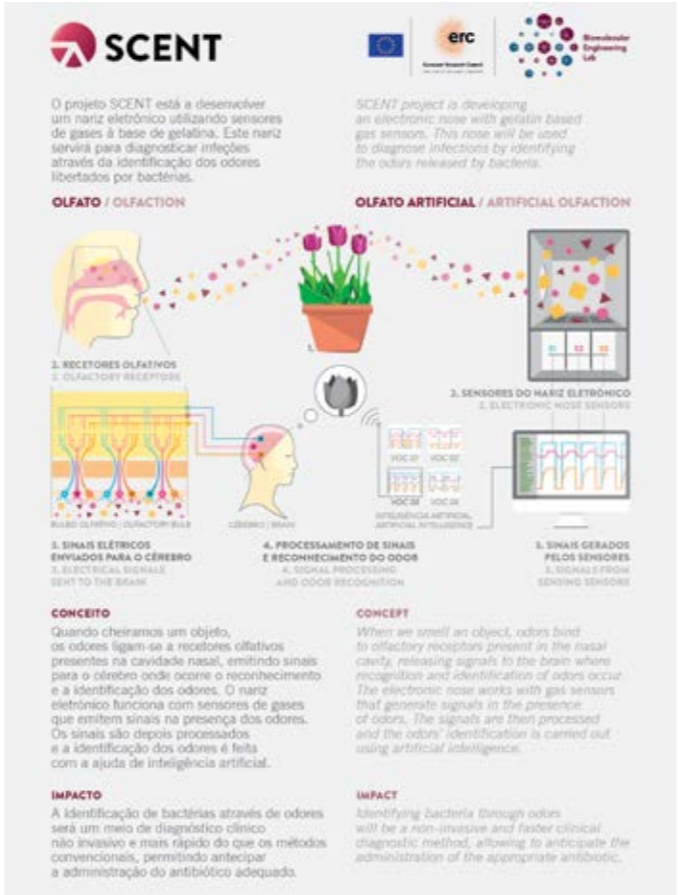


Figure 1. Flyer of the project

E-noses are comprised of an array of gas-sensitive materials that have different, but complementary, selectivity. When considering the entire array, the e-nose produces a unique pattern of signals to each sample. E-noses thereby mimic the operation of the biological receptors that exist in the nose, which recognize odors in a combinatorial manner, and the brain, that processes the data with sophisticated pattern recognition systems, being capable of identifying simple or complex odors.

Recent works demonstrate that fast microbial identification is possible with chemical e-nose sensors. These sensors usually present limited stability and selectivity, and require aggressive conditions during processing and operation. Therefore, bioinspired e-nose sensors, employing biological olfactory receptors, are an alternative. Unfortunately, their complexity and low stability are a limitation.

What about gels that smell?

The SCENT team is working with an innovative class of volatile-responsive gels for e-noses, which tackle the key challenges encountered in the other systems. Our gels are customizable and have a low environmental footprint. The SCENT project is exploring the potential of these new materials to advance the field of odor detection, while providing new tools for the scientific community. To accomplish this, the team is: 1) building libraries of gels with semi-selective and selective properties, 2) generating odorant specific ligands mimicking olfactory receptors, 3) assembling artificial noses for the analysis of microbial volatiles, 4) creating databases with organism- volatile specific signal signatures, 5) identifying pathogenic bacteria, including those with acquired antimicrobial-resistances.

The new materials developed within the SCENT project are sensitive to both chemical and physical stimuli, and as such several future applications can be envisaged compatible with miniaturized, wireless and wearable devices, from bioplastic electronics to electrochemical and medical devices.

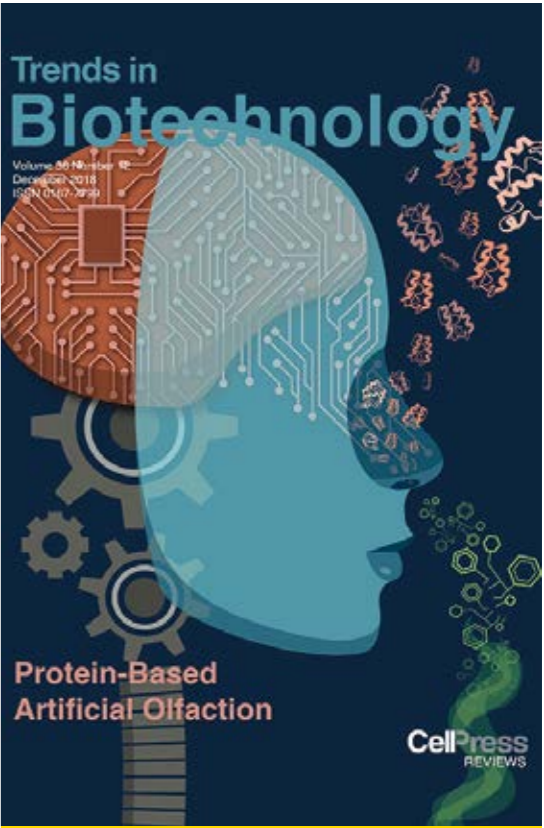


Figure 2. Front cover of the journal Trends in Biotechnology (Barbosa, AJM, Oliveira AR, Roque ACA. 2018. 36(12):1244-1258)

NOVA TALENT – ERC GRANTEE

ANA RITA DUARTE

> **NAME PRINCIPAL INVESTIGATOR**

ANA RITA CRUZ DUARTE

> **HOSTING INSTITUTION**

FCT NOVA

> **STARTING DATE**

1ST MARCH 2017

> **FUNDING AWARDED**

1 877 006. 00€

> **WEBSITE**

sites.fct.unl.pt/des-solve

PROJECT TITLE

WHEN SOLIDS BECOME LIQUIDS: NATURAL DEEP EUTECTIC SYSTEMS FOR CHEMICAL PROCESS ENGINEERING

PROJECT ACRONYM

DES SOLVE

SCIENTIFIC AREAS

Chemical Engineering

Green Chemistry

Extraction

Biocatalysis

Therapeutic applications

BRIEF DESCRIPTION

Sugars, aminoacids or organic acids are typically solid at room temperature. Nonetheless when combined at a particular molar fraction they present a high melting point depression, becoming liquids at room temperature. These are called Natural Deep Eutectic Solvents – NADES. NADES are envisaged to play a major role on different chemical engineering processes in the future, playing a significant role towards the development of greener and sustainable processes. Nonetheless, there is a significant lack of knowledge on fundamental and basic research on NADES, which is hindering their industrial applications. For this reason it is important to extend the knowledge on these systems, boosting their application development. NADES applications go beyond chemical or materials engineering and cover a wide range of fields from biocatalysis, extraction, electrochemistry, carbon dioxide capture or biomedical applications. Des.solve encompasses four major themes of research: 1 – Development of NADES and therapeutic deep eutectic solvents – THEDES; 2 – Characterization of the obtained mixtures and computer simulation of NADES/THEDES properties; 3 – Phase behaviour of binary/ternary systems NADES/THEDES + carbon dioxide and thermodynamic modelling; 4 – Application development. Starting from the development of novel NADES/THEDES which, by different characterization techniques, will be deeply studied and characterized, the essential raw-materials will be produced for the subsequent research activities. The envisaged research involves modelling and molecular simulations. Des.solve will be deeply engaged in application development, particularly in extraction, biocatalysis and pharmaceutical/biomedical applications. The knowledge that will be created in this proposal is expected not only to have a major impact in the scientific community, but also in society, economy and industry.



PROJECT HIGHLIGHTS

> **PUBLICATIONS**

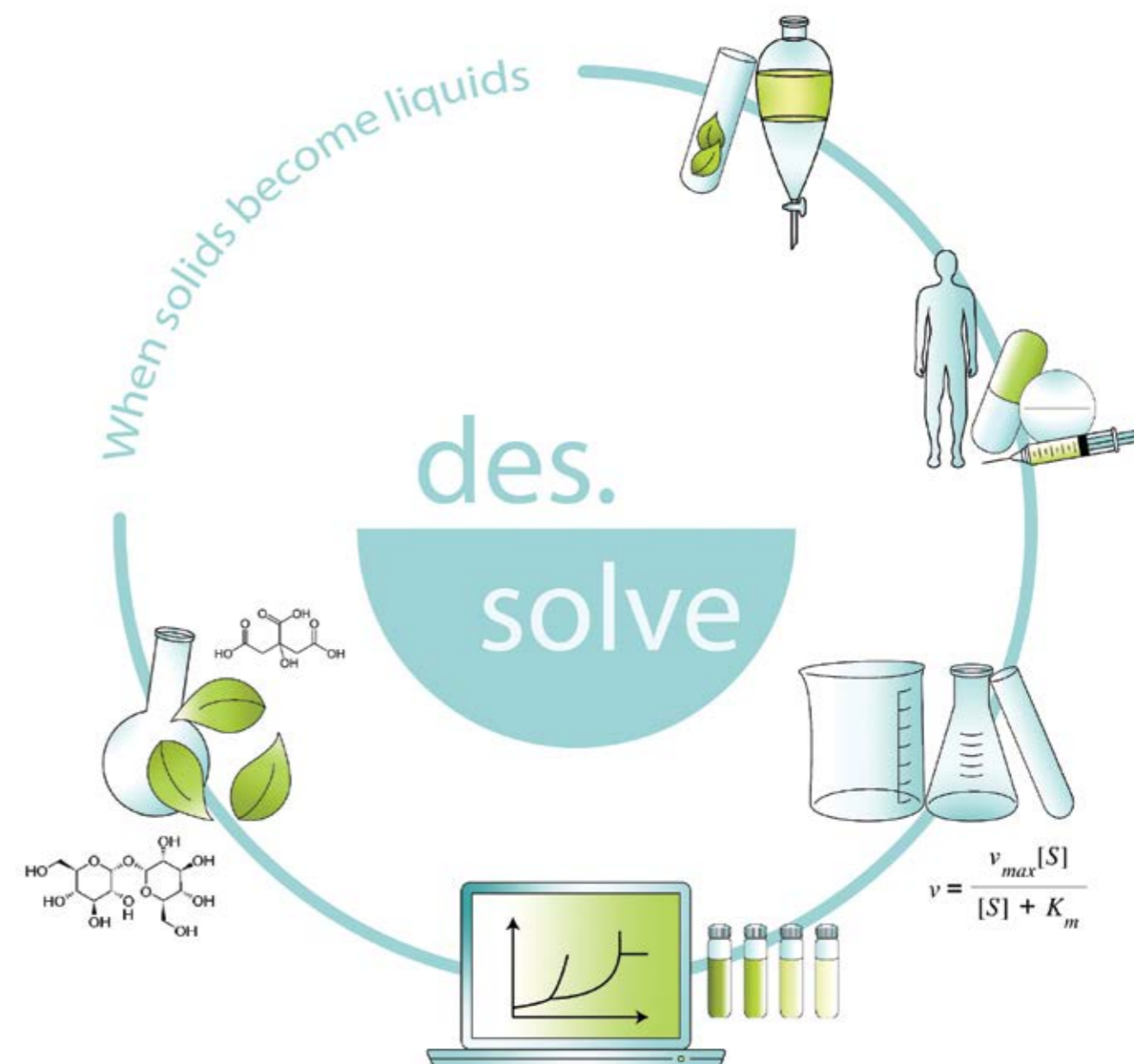


> **CONFERENCES**



Organization of the 1st International Meeting on Deep Eutectic Systems Conference which gathered in Lisbon nearly 140 specialists in the field

> **PATENTS**



NOVA TALENT – ERC GRANTEE

ANTÓNIO JACINTO

> NAME PRINCIPAL INVESTIGATOR

ANTÓNIO JACINTO

> GRANT 1 RESEAL

HOSTING INSTITUTION

FCT NOVA

DURATION

1ST NOVEMBER 2008 – 31ST OCTOBER 2014

FUNDING AWARDED

1 150 000, 00€

> GRANT 2 EMODI

HOSTING INSTITUTION

NOVA UNIVERSITY LISBON

DURATION

1ST OCTOBER 2016 – 31ST MARCH 2018

FUNDING AWARDED

147 500, 00€



RESEAL

PROJECT TITLE

EPITHELIAL RESEALING

SCIENTIFIC AREAS

Invertebrate zoology
Genetics and heredity
Cell Biology

BRIEF DESCRIPTION

Epithelia have the essential role of acting as a barrier that protects living organisms and its organs from the surrounding milieu. Therefore, it is crucial for epithelial tissues to have robust ways of maintaining its integrity despite the frequent damage caused by normal cell turnover, inflammation and injury. All epithelia have some capacity to repair themselves, however, the wound-healing process differs dramatically between the developmental stage and type of tissue involved. This project focused on investigating the capacity that several simple epithelial tissues have to reseal small discontinuities very rapidly and efficiently. This repair mechanism that we call epithelial resealing is based on the contraction of an actomyosin purse string in the leading edge cells around the wound margin. Epithelial resealing seems to be a fundamental repair mechanism, acting in several types of simple embryonic and adult epithelia, in both vertebrates and invertebrates. The cell biology of epithelial resealing has started to be understood but there are still many open questions and the signalling cascades that regulate this process are largely unknown. We studied the epithelial resealing using a combination of genetics and high resolution live imaging. The *Drosophila* embryonic epithelium was our primary model system and we started by characterizing in detail novel genes involved in resealing that have been identified in a pilot screen previously performed in the laboratory. We also performed a new RNAi genetic screen based on a very large collections of transgenic lines to completely unravel the signalling network that controls epithelial resealing. In order to investigate how conserved in vertebrates are the epithelial resealing mechanisms, we established epithelial wounding assays in zebrafish simple epithelial tissues and we studied, in this vertebrate model system, the molecular mechanisms that we will uncover using *Drosophila*.

EMODI

PROJECT TITLE

EPITHELIAL RESISTANCE MODULATION TO TREAT DISEASE

SCIENTIFIC AREAS

Medical and health sciences
Basic medicine
Physiology
Homeostasis

BRIEF DESCRIPTION

Epithelial barriers are essential for organism's homeostasis and survival. Defects in resistance of body barrier epithelial tissues and their repair are thought to underlie a range of diseases, which affect millions. António Jacinto's group has discovered that Septate/Tight Junctions are essential for epithelial repair. These cell-cell junctions

can be potentially targeted by candidate compounds that have been identified by Thelial, a Start-Up that will collaborate in this project. In EMODI we completed preclinical proof of concept of the potential therapeutic activity of two selected compounds, relying on scientific results and technologies developed under ERC starting grant awarded to Dr. António Jacinto. Regarding clinical application, we focused on rare (orphan) diseases which have been associated to impaired epithelial repair in the gastro-intestinal track for which there are very limited treatment options: Sjoerger Syndrome (SjS) and Eosinophilic Esophagitis (EoE). The planned activities involved the following steps: 1) Biological efficacy testing of the-1 and the-2 in a zebrafish Tight Junction model and in mouse models of the diseases under focus; 2) Development of IPR based on the biological testing; 3) Consolidate outcomes of steps 1 and 2 into a business plan; 4) Present the business plan to VC funds to seek for extra round of funding. The long-term aim is clinical development of our candidates not only in the context of SjS and EoE but also towards a range of o diseases where impaired epithelial barrier function is impaired and a cause of morbidity.

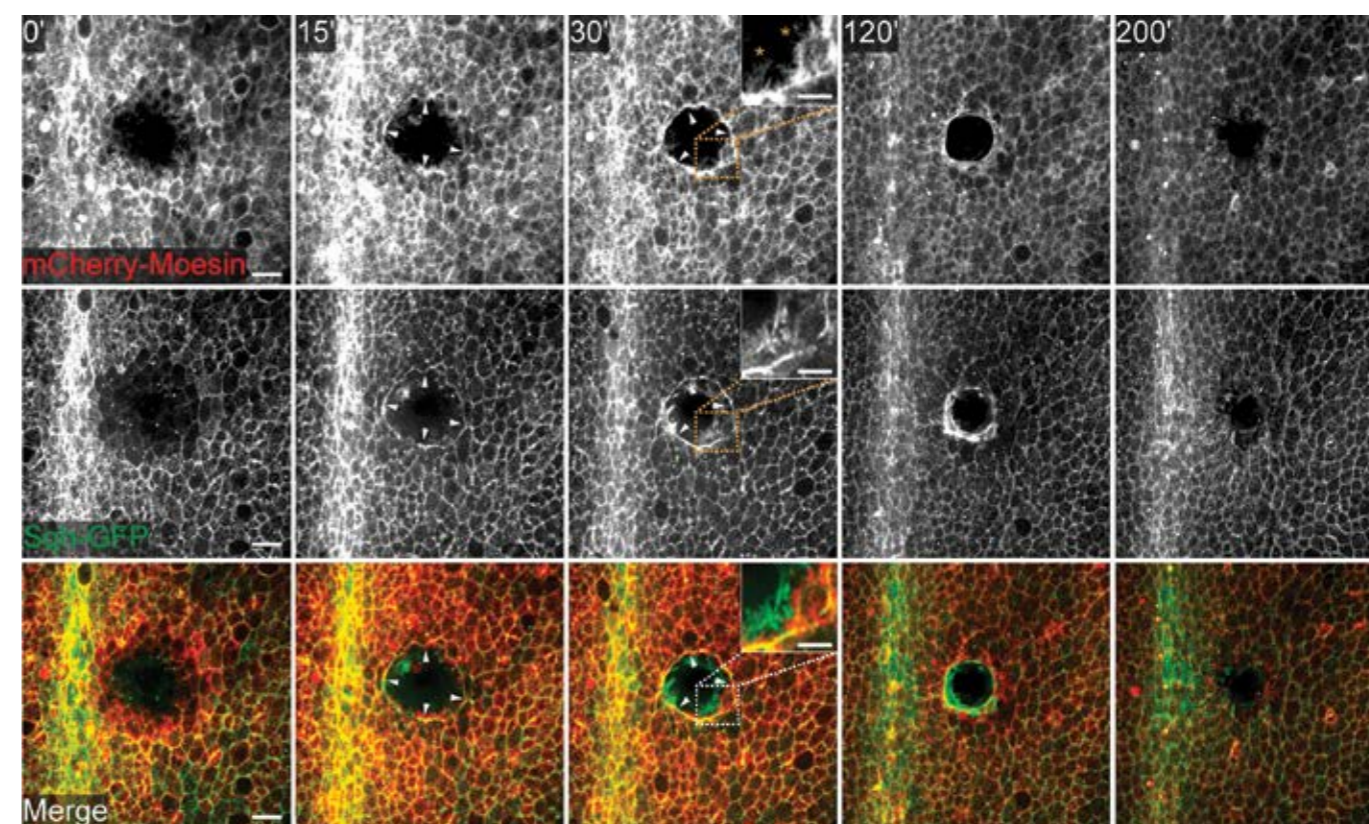


Figure. *Drosophila* pupal wound healing. Movie stills of a wounded pupal notum expressing mCherry-Moesin under the control of pnr-GAL4 and Sqh- GFP show that pupal epithelial repair recapitulates embryonic wound healing. White arrowheads highlight the actomyosin cable. Actin-rich protrusions, such as lamellipodia and filopodia, are highlighted in the zoom panel at 30 min after wounding. Time after wounding is indicated in the top panels. Bars: (main panels) 20 µm; (insets) 10 µm. Source: J. Cell Biol. Vol. 202 No. 2 365–379

PROJECT HIGHLIGHTS > PUBLICATIONS



16

Moreira, Carolina G. A., Regan, Jennifer C., Zaidman-Rémy, Anna, Jacinto, Antonio, Prag, Soren; ***Drosophila Hemocyte Migration: An In Vivo Assay for Directional Cell Migration***. Methods in Molecular Biology book series, vol 769, (2011).

Cordeiro, Joao V., Jacinto, Antonio; ***The role of transcription-independent damage signals in the initiation of epithelial wound healing***. Nature Reviews Molecular Cell Biology, 14, 249–262 (2013).

Yoo, Sa Kan, Pascoe, Heath G., Pereira, Telmo, Kondo, Shu, Jacinto, Antonio, Zhang, Xuewu, Hariharan, Iswar K.; ***Plexins function in epithelial repair in both Drosophila and zebrafish***. Nature Communications, 7:12282, (2016).

NOVA TALENT – ERC GRANTEE
CARLA FERNANDES

> **NAME PRINCIPAL INVESTIGATOR**
CARLA MONTEZ FERNANDES

> **HOSTING INSTITUTION**
NOVA FCSH

> **STARTING DATE**
2014

> **FUNDING AWARDED**
1 378 200. 00€

> **WEBSITE**
blackbox.fcsh.unl.pt

PROJECT TITLE

A COLLABORATIVE PLATFORM TO DOCUMENT PERFORMANCE COMPOSITION: FROM CONCEPTUAL STRUCTURES IN THE BACKSTAGE TO CUSTOMIZABLE VISUALIZATIONS IN THE FRONT-END.

PROJECT ACRONYM

BLACKBOX

SCIENTIFIC AREAS

Cognitive Science
Neurosciences
Performing Arts
Computer Vision
Intangible Cultural Heritage

BRIEF DESCRIPTION

BlackBox aims at developing a cutting-edge model for a web-based collaborative platform, dedicated to the documentation of compositional processes by performing artists with a focus on contemporary dance and theatre. The platform will enable a robust representation of the implicit knowledge in performing practices while applying novel visualization technologies to support it.

Choreographer João Fiadeiro was our first case study, Rui Lopes Graça the second, and Sylvia Rijmer the last one.

As an Arts&Cognition Lab, BlackBox aims at the analysis of the invited artists' unique conceptual structures, by crossing the empirical insights of contemporary creators with research theories from Multimodal Communication (Human Interaction, Gesture Studies, Cognitive Science) and Computer Vision.

Main objectives:

- Perform theoretical and innovative interdisciplinary research on the intersection of multimodal communication and cognition, performance studies and digital technologies.
- Document, transmit and preserve the tacit embodied knowledge contained in performance composition processes.
- Assist artists with creative tools to facilitate their choreographic/dramaturgic practices on a collaborative basis.

The ERC Grant, which funds this entire project, has allowed the recruitment of five Post-Docs and three PhD students in the research domains of Cognitive Linguistics, Neurosciences, Digital Media applied to the Performing Arts, and Computer Science. The project also hosts external collaborators in the areas of graphic and web design, video processing, photography and software development, as well as international consultants in Digital Archiving and Intangible Cultural Heritage.

It has additional collaborators from: Interactive Multimedia Group at FCT NOVA; the Neuroscience Programme at the Champalimaud Centre for the Unknown; C-DaRE at Coventry University, UK; The Linguistics Centre of University of Porto; and the Motion Bank Institute, Frankfurt.

Our first case study with João Fiadeiro was carried out between October 2014 and March 2016. His "Composition in Real Time method" and respective conceptual performances were our main point of interest, which Fiadeiro has developed throughout the past 25 years. Since

PROJECT HIGHLIGHTS

> **PUBLICATIONS**

25

> **PATENTS**

1

> **DIGITAL OUTPUTS**



- 1 **software prototype** for multimodal communication analysis
- 1 **software** (beta-version) for video annotation in real-time
- 4 **animated infographic videos**
- A **360° platform**
- A **VR immersive installation**
- 3 **long video documentaries**

Fiadeiro's professional activities extend across the fields of choreography, performance, pedagogy and research, my team has designed three studies articulated with different technological tools to investigate the complex aspects of his work.

Our second case study on choreographer Rui Lopes Graça was carried out between 2016 and 2017. Rui Graça is an established choreographer of National Ballet of Portugal (CNB) who has a track-record in both classical and contemporary dance. We wanted to work with a contrastive author to Fiadeiro in order to analyse a compositional process (his piece "15 Bailarinos e Tempo Incerto" with plastic artist João Penalva) with very explicit choreographic rules and instructions to be followed by the dancers and much less space for improvisation, consequently generating totally different interaction and artistic paradigms. In the Lab, our research interests covered: the analysis of the choreographer's decision-making patterns following a neuroscience decision-making paradigm; the study of the "marking" phenomenon used by the dancers to memorize dance sequences; the interaction between touch and vocalisations in the communication between choreographer and dancers; and the production of a 360° video platform to visualize the creative process of "15 Bailarinos e Tempo Incerto", using animated and interactive annotations as well.

The last case study has resulted from the convergence between Sylvia Rijmer's drive to formalise her compositional methodologies and our scientific drive to frame, analyse and make tangible an artistic process, where we could reveal the patterns which influence the decision-making processes underlying the creation of a dance piece. In a first phase we have designed a behavioural task to analyse the factors and patterns which influence the decision-making process of a contemporary choreographer during the creation of a short performative piece with four dancers. In a second phase we have challenged Sylvia to prompt the dancers to physically illustrate some of her main pre-choreographic concepts, namely Dodging and Scanning and their sub-categories as defined by her. My team and herself have then carried out an analytical investigation to structure her empirical knowledge framed around cognitive attention and movement habitual patterns within an artistic dance practice poised to question the negotiation of "choice" in dance. In this case-study we have focused on technologies for motion tracking and high-speed photography of dance sequences to then generate innovative visualizations and annotations in 3D and VR environments. We have produced an immersive VR installation launched to the public during the international "InShadow Festival 2019".

SELECTED PUBLICATIONS

FERNANDES, C., EVOLA, V., & SKUBISZ, J. (2019). "Performance mode under the microscope: a cognitive semiotic analysis of eye gaze and other body movements in a contemporary dance improvisation". In Galhano-Rodrigues, Zagar Galvão and Cruz-Santos (Eds.). Recent Perspectives on Gesture and Multimodality. Newcastle upon Tyne: Cambridge. pp. 121-135

EVOLA, V., SKUBISZ, J., & FERNANDES, C. (2019). Data and Material for "Coordinated collaboration and nonverbal social interactions." <https://doi.org/10.17605/OSF.IO/HFXBN>

KUFFNER DOS ANJOS, RAFAEL, RIBEIRO, C., and FERNANDES, C. (2018). "Three-Dimensional Visualization of Movement Qualities in Contemporary Dance". In Proceedings of the 5rd. International Symposium on Movement and Computing. ACM.

RIBEIRO, C., KUFFNER DOS ANJOS, RAFAEL, and FERNANDES, C. (2018). "Virtual Reality Annotator: A Tool to Annotate Dancers in a Virtual Environment". In: Ioannides M. (Ed.) Digital Cultural Heritage. Lecture Notes in Computer Science, Vol. 10605. Springer.

JÜRGENS, S., & FERNANDES, C. (2017). "Choreographic practice-as-research - Visualizing conceptual structures in contemporary dance" in Arlander, Barton, Dreyer-Lude, Spatz (Eds.) Performance as Research: Knowledge, methods, impact, pp. 249-274. Routledge.

FERNANDES, C. & JÜRGENS, S. (2016). "Moving from an artist-led practice into self-emerging educational approaches." Performance Research, Volume 21, Issue 6: 'On Radical Education', pp. 71-77. DOI: 10.1080/13528165.2016.1239910

NOVA TALENT – ERC GRANTEE

CATARINA HOMEM

> NAME PRINCIPAL INVESTIGATOR

CATARINA C. HOMEM

> HOSTING INSTITUTION

CEDOC – NOVA Medical School

> STARTING DATE

1ST FEBRUARY 2018

> FUNDING AWARDED

1 697 493. 00€

PROJECT TITLE

METABOLIC AND TIMED CONTROL OF STEM CELL FATE
IN THE DEVELOPING ANIMAL

PROJECT ACRONYM

STEMCELLHABITAT

SCIENTIFIC AREAS

Life Sciences

BRIEF DESCRIPTION

Stem cell proliferation during development requires tight spatial and temporal regulation to ensure correct cell number and right cell types are formed at the proper positions. Currently very little is known about how SCs are regulated during development. Specifically, it is unclear how stem cell waves of proliferation are regulated and how the fate of their progeny changes during development. In addition, it has recently become evident that metabolism provides additional complexity in cell fate regulation, highlighting the need for integrating metabolic information across physiological levels.

This project will answer the question of how the combination of metabolic state and temporal cues (animal developmental stage) regulate stem cell fate. I will use *Drosophila melanogaster*, an animal complex enough to be similar to higher eukaryotes and yet simple enough to dissect the mechanistic details of cell regulation and its impact on the organism. *Drosophila* neural stem cells, the neuroblasts (NB), are a fantastic model of temporally and metabolically regulated cells. NB lineage fate changes with time, directing the generation of a stereotypical set of neurons, after which they disappear. We have previously found that metabolism is an important regulator of NB cell cycle exit, which occurs in response to an increase in levels of oxidative phosphorylation.

Using a multidisciplinary approach combining genetics, cell type/age sorting, multi-omics analysis, fixed and 3D-live NB imaging and metabolite dynamics, I propose an integrative approach to investigate how NBs are regulated in the developing animal. We are dissecting the mechanisms by which metabolism regulates NB fate; investigating how metabolism contributes to NB unlimited proliferation and brain tumors; and addressing how temporal transcription factors and hormones dynamically affect cell fate decisions during development



Figure 1. *Drosophila* Ovary

PROJECT HIGHLIGHTS

● EXPECTED ● COMPLETED

> PUBLICATIONS



> AWARDS



> COMPETITIVE FELLOWSHIPS-TEAM



> POSTDOC, PhD AND MSc SUPERVISION



> INVITED SPEAKER IN INTERNATIONAL MEETINGS

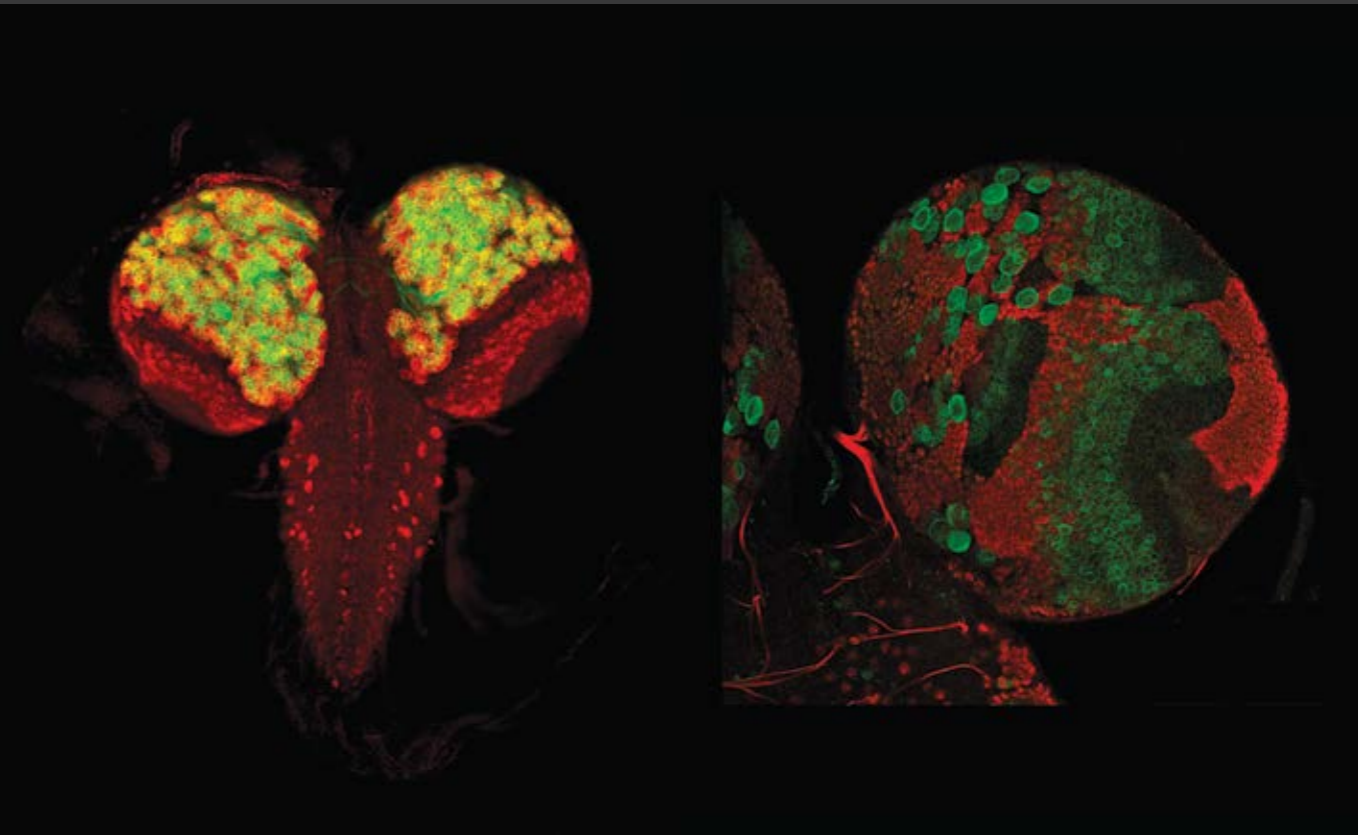


Figure 2. *Drosophila* Brain Tumor

Figure 3. *Drosophila* wild-type brain

NOVA TALENT – ERC GRANTEE

CLÁUDIA SANTOS

> **NAME PRINCIPAL INVESTIGATOR**

CLÁUDIA NUNES DOS SANTOS

> **HOSTING INSTITUTION**

CEDOC – NOVA Medical School

> **STARTING DATE**

1ST APRIL 2019

> **FUNDING AWARDED**

1.496.022€



PROJECT TITLE

ZOOMING THE LINK BETWEEN DIET AND BRAIN HEALTH:
HOW PHENOLIC METABOLITES MODULATE BRAIN
INFLAMMATION

PROJECT ACRONYM

LIMBO

SCIENTIFIC AREAS

Molecular Nutrition
Polyphenols metabolism
Neuroinflammation
Parkinson's disease

BRIEF DESCRIPTION

Currently a big concern of our aging society is to efficiently delay the onset of neurodegenerative diseases, which are progressively rising in incidence. The paradigm that a diet rich in the phenolics, prevalent e.g. in fruits, is beneficial to brain health has reached the public. However their mechanistic actions in brain functions remain to be seen, particularly since the nature of those acting in the brain remains overlooked.

LIMBo address this gap by identifying candidate compounds that can support development of effective strategies to delay neurodegeneration. Specifically, analysing the potential of dietary phenolics in both prevention and treatment (i.e delay) of neuroinflammation – key process shared in neurodegenerative diseases. To break down the current indeterminate status of “cause vs effect”, the focus of LIMBO is on metabolites derived from dietary phenolics that reach the brain. It will be investigated their effects in both established and unknown response pathways of microglia cells – the innate immune cells of the central nervous system, either alone or when communicating with other brain cells. Ultimately, to attain an integrated view of their effects nutrition trials in mice will established. LIMBo considers both pro- and anti- inflammatory processes to preliminary validate the action of any promising metabolite in prevention and/or therapeutics. LIMBo provides valuable scientific insights for future implementation of healthy brain diets. Final aim of LIMBo will be to create far-reaching opportunities by generating knowledge that impacts our fundamental understanding on the diversity of phenolic metabolites and their specific influences in neuroinflammation and potential use as prodrugs.

PROJECT HIGHLIGHTS

> **PUBLICATIONS**



2

Carregosa, D, Carecho, R, Figueira, I., Santos, CN, **Low-Molecular Weight Metabolites from Polyphenols as Effectors for Attenuating Neuroinflammation**, 2019. Journal of Agricultural and Food Chemistry. DOI: 10.1021/acs.jafc.9b02155

Carecho, R, Carregosa, D, Santos, CN **Low molecular weight (poly)phenol metabolites across the blood-brain barrier: the underexplored journey**, 2020, submitted

> **AWARDS**



1

Prémio Inovação 2019
9º Encontro de produtores de mirtos, Guarda

> **VIDEO**



1

Video at NOVA Medical School UNL Youtube Channel

www.youtube.com/watch?v=KyPhBmluWtI

> **PRESS RELEASES**



1

visao.sapo.pt/sociedade/2019-11-09-Demencia-como-escolher-os-alimentos-certos-pode-ajudar-a-retardar-a-destruicao-dos-neuronios/

> **ORAL PRESENTATIONS BY INVITATION**



5

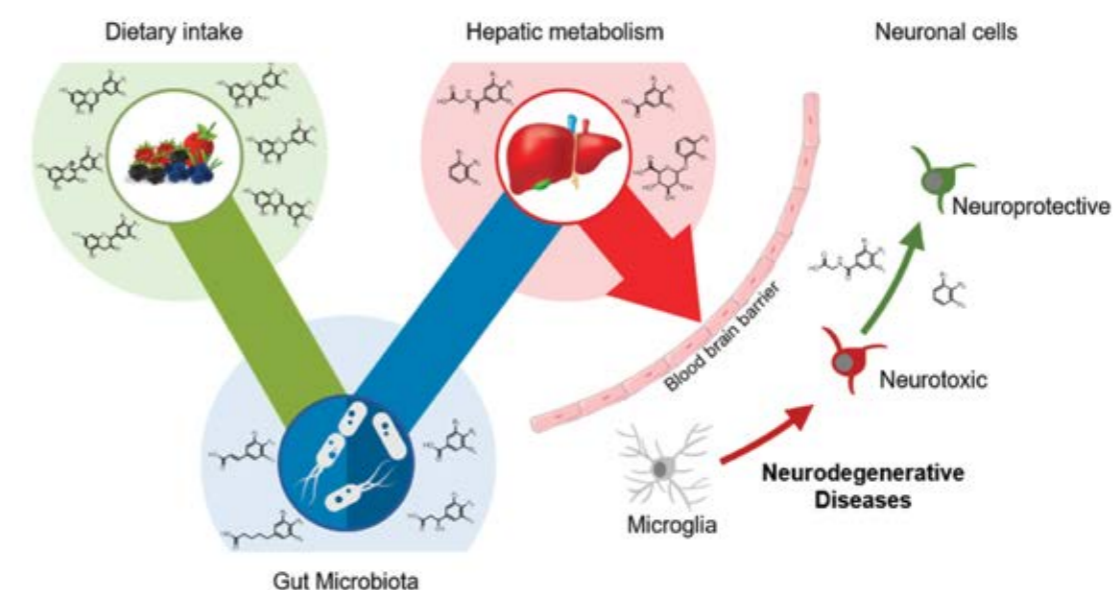
3rd International Conference on Food Contaminants, Aveiro, September 2019

International Symposium on Current Topics of Dietary Polyphenols in Disease Prevention special symposium for 13th Annual Meeting of Japanese Society for Polyphenol, Nov. 28th, 2019, Kobe Convention Center, Kobe, Japan

9th International Conference on Polyphenols and Health, November 28 x December 5, 2019, Kobe Convention Center, Kobe, Japan

3rd International Conference on Food Bioactives & Health, 2020, Parma, Italy

30th International Conference on Polyphenols, 2020 Turku, Finland



NOVA TALENT – ERC GRANTEE

CRISTINA PEREIRA

> **NAME PRINCIPAL INVESTIGATOR**

CRISTINA SILVA PEREIRA

> **HOSTING INSTITUTION**

NOVA University Lisbon

> **STARTING DATE**

1ST SEPTEMBER 2015

> **FUNDING AWARDED**

1.795.968€



PROJECT TITLE

DEVELOPMENT OF BIOMATERIALS THROUGH MIMESIS OF PLANT DEFENSIVE INTERFACES TO FIGHT WOUND INFECTIONS

PROJECT ACRONYM

MIMESIS

SCIENTIFIC AREAS

Biomimetics

Prevention and treatment of infection by pathogens

Antimicrobial biomaterials

Plant lipid polymers

Microbiology

BRIEF DESCRIPTION

Fighting microbial infection of wounds, especially in immunocompromised patients, is a major challenge in the 21st century. The skin barrier is the primary defence against microbial (opportunistic) pathogens. When this barrier is breached even non-pathogenic fungi may cause devastating infections, most of which provoked by crossover fungi able to infect both plant and humans. Hence, diabetic patients (ca. 6.4% of the world population), who are prone to develop chronic non-healing wounds, constitute a major risk group. My research is driven by the vision of mimicking the functionality of plant polyesters to develop wound dressing biomaterials that combine antimicrobial and skin regeneration properties. Land plants have evolved through more than 400 million years, developing defence polyester barriers that limit pathogen adhesion and invasion. The unique chemical composition of the plant polyester and its macromolecular assembly determines its physiological roles, however extracting polyesters from plants results in the loss of both native structure and inherent barrier properties. We have developed biocompatible extraction methods that preserve the molecular structure of plant polyesters, their film forming abilities and also their inherent biological properties. The ex-situ reconstituted polyester films display the native barrier properties, including potentially broad antimicrobial and anti-biofouling effect. Our vision is to explore biomimesis strategies of plant polyesters to develop new and efficient antifungal therapies.

PROJECT HIGHLIGHTS

> **PUBLICATIONS**



2+2

V.G.Correia, A. Bento, J.Pais, R.Rodrigues, Ł.P.Haliński, M. Frydrych, A.Greenhalgh, P. Stepnowski, F.Vollrath, A.W.T.King, C. Silva Pereira. **The molecular structure and multifunctionality of the cryptic plant polymer suberin.** Materials Today. 2020. 5, 100039

Disclosed the molecular structure of plant polyesters in wild-type and mutants, both *ex-situ* and *in situ* (solution NMR) essential to build structural activity correlations (*under review*)

Isolated nanoparticles of the plant polymer suberin that display potent bioactivity (*under review*)

> **MASTER THESIS**



3

> **PHD THESIS**



2

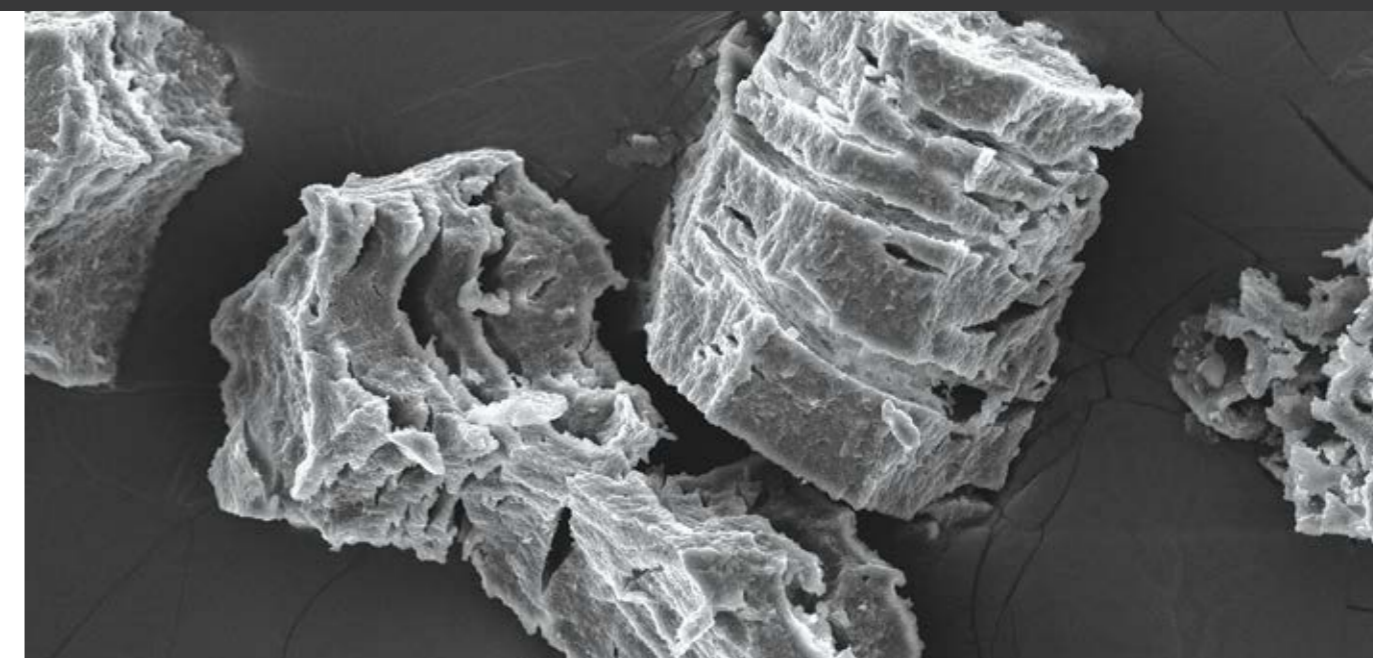


Figure 1. Spontaneously aggregation of suberin particles into polygonal structures during lyophilisation of suberin extracted from cork using a customised ionic liquid process.

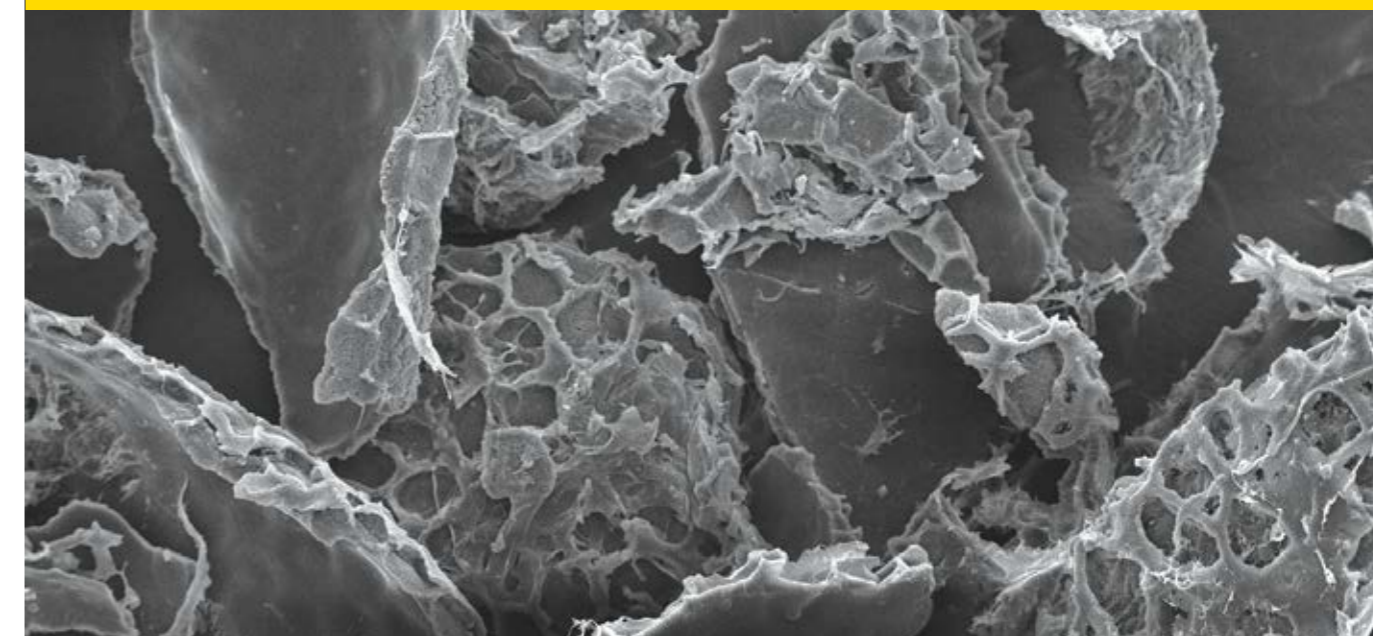


Figure 2. A waterproof cutin-continuum extracted from tomato peels using a customised ionic liquid based process.

NOVA TALENT – ERC GRANTEE ELVIRA FORTUNATO

> **NAME** PRINCIPAL INVESTIGATOR
ELVIRA FORTUNATO

> **GRANT 1** INVISIBLE
HOSTING INSTITUTION
FCT NOVA

DURATION
1ST JANUARY 2009 – 31ST DECEMBER 2014

FUNDING AWARDED
2 250 000, 00€

WEBSITE
sites.fct.unl.pt/invisible

> **GRANT 2** DIGISMART
HOSTING INSTITUTION
NOVA UNIVERSITY LISBON

STARTING DATE
1ST JANUARY 2019

FUNDING AWARDED
3 495 250, 00€

WEBSITE
sites.fct.unl.pt/digismart

INVISIBLE

PROJECT TITLE

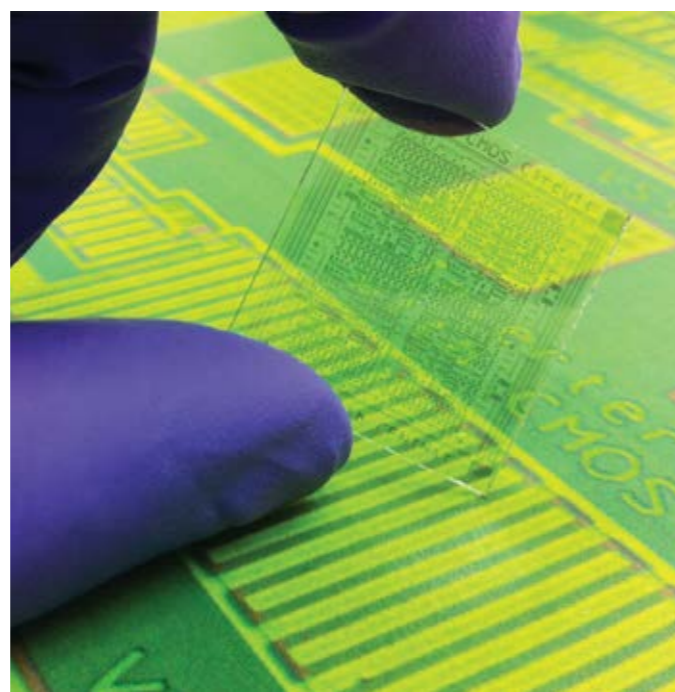
ADVANCED AMORPHOUS MULTICOMPONENT OXIDES
FOR TRANSPARENT ELECTRONICS

SCIENTIFIC AREAS

Transparent electronics | Paper Electronics | Thin film transistors
Nanotechnologies | Metal oxide semiconductors

BRIEF DESCRIPTION

Imagine having a fully transparent and flexible, foldable, low cost, displays or at the glass window of your home/office, a transparent electronic circuit, do you believe on that? Maybe you are asking me if I am writing science fiction. No, I am not. In fact, this is a very ambitious objective but is tangible in the framework of this project due to the already acquired experience in the development of transparent thin film transistors (TFTs) using novel multifunctional and multicomponent oxides that can behave as active or passive semiconductor materials. This was an interdisciplinary research project aiming to develop a new class of transparent electronic components, based on multicomponent passive and active oxide semiconductors (n and p-types), to fabricate the novel generation of full transparent electronic devices and circuits, either using rigid or flexible substrates. The emphasis was put on developing thin film transistors (n and p-TFTs) and integrated circuits for a broad range of applications (from inverters, C-MOS like devices, ring oscillators, CCDs backplanes for active matrices, biosensor arrays for DNA/RNA/proteins detection), boosting to its maximum their electronic performances for next generation of invisible circuits. By doing so, we contributed for generating a free real state electronics that was able to add new electronic functionalities onto surfaces, which currently are not used in this manner and that silicon cannot contribute. The multicomponent metal oxide materials developed exhibited (mainly) an amorphous or a nano-composite structure and was processed by PVD techniques like rf magnetron sputtering at room temperature, compatible with the use of low cost and flexible substrates (polymers, cellulose paper, among others). These facilitated a migration away from tradition silicon like fab based batch processing to large area, roll-to-roll manufacturing technology that offered significant advantages.



PROJECT HIGHLIGHTS

> AWARDS

- 18 INVISIBLE** 2016 – **Blaise Pascal Medal** by the European Academy of Sciences in the area of Materials Science
- 3 DIGISMART** **Czochralski award** in recognition of her research work in the area of Advanced Materials Science by the Polish Academy of Sciences in conjunction with the European Society for Research on Materials (E-MRS), the Polish Society of Materials Science and the Polish Crystal Growth Society.
- Prémio APIGRAF**, Personalidade do ano 2019.

> MEDIA

- INVISIBLE** Looks good on paper: A new use for a common material, **The Economist**, October 16th 2008.
- A cientista que ganhou 2,25 milhões de euros, **Jornal Expresso**, 2008.
- TVI24 – **Entrevista da Jornalista Judite Sousa** Elvira Fortunato, 2016.
- DIGISMART** Investigadora Elvira Fortunato conquista bolsa de 3,5 milhões de euros, **Diário de Notícias**, 2018.
- Elvira Fortunato: a cientista que revolucionou o papel; **Jornal de Negócios**, 2018.
- E tudo os chips criaram na era digital. Mas há uma nova revolução à espreita, **Dinheiro Vivo**, 2019.

> BOOKS INVISIBLE

- 5** **Transparent oxide electronics: from materials to devices**. P. Barquinha, R. Martins, L. Pereira, E. Fortunato, John Wiley & Sons, 2012

> EVENTS INVISIBLE

- Inauguração do Laboratório de Nanofabricação** da FCT NOVA pelo Presidente República, Prof. Aníbal Cavaco Silva, 2011.

> PUBLICATIONS

63 INVISIBLE

Oxide semiconductor thin-film transistors: a review of recent advances. E Fortunato, P Barquinha, R Martins. Advanced Materials 24 (22), 2945–2986 (2012).

Recyclable, flexible, low-power oxide electronics. Rodrigo F. P. Martins, Arman Ahnood, Nuno Correia, Luís M. N. P. Pereira, Raquel Barros, Pedro M. C. B. Barquinha, Ricardo Costa, Isabel M. M. Ferreira, Arokia Nathan, Elvira E. M. C. Fortunato. Advanced Functional Materials 23 (17), 2153–2161 (2013).

Complementary metal oxide semiconductor technology with and on paper. Rodrigo Martins, Arokia Nathan, Raquel Barros, Luís Pereira, Pedro Barquinha, Nuno Correia, Ricardo Costa, Arman Ahnood, Isabel Ferreira, Elvira Fortunato, Advanced Materials 23 (39), 4491–4496 (2011).

4 DIGISMART

G. Ferreira, S. Goswami, S. Nandy, L. Pereira, R. Martins, and E. Fortunato, **“Touch-Interactive Flexible Sustainable Energy Harvester and Self-Powered Smart Card”**, Advanced Functional Materials, vol. 30, no. 5, 2020.

> THESIS DISSERTATIONS

- 20 INVISIBLE** 8 PhD Thesis
12 Master Thesis
- 3 DIGISMART** An electrochromic paper-based device as a diagnostic test for cystic fibrosis, MSc Thesis Alexandra Fernandes, FCT NOVA 2019.

> PATENTS INVISIBLE

- 25** **Thin film transistor and method of manufacturing the same**, Dong-hun Kang-lun Song, Elvira Fortunato, Rodrigo Martins, Samsung Electronics Co Ltd, 2008, US20080277663A1

DIGISMART

PROJECT TITLE

MULTIFUNCTIONAL DIGITAL MATERIALS PLATFORM
FOR SMART INTEGRATED APPLICATIONS

SCIENTIFIC AREAS

Metal oxide semiconductors

BRIEF DESCRIPTION

DIGISMART creates new avenues into two main areas: 1) processing nanomaterials/nanostructures applied to electronic devices by exploring a new digital multifunctional direct laser writing method for in situ synthesis of small-sized nanomaterials/nanofilms micro-patterned growth by selective photothermal decomposition of semiconductors, dielectrics and conductors precursors and 2) provide simultaneously multifunction to single based metal oxide devices (like thin film transistors, the workhorses for large

area electronics having electron, charge and color modulation), as the basic unit to promote systems' integration by exploring the use of new advanced materials with unique multi-functionalities using low cost process solutions. This new fabrication process will be very useful for low-cost, eco-friendly, and efficient fabrication of nanostructures and thin films-integrated microelectronic devices due to its low-power, simple setup as well as excellent reliability. This new and disruptive concept will be achieved with low cost and non-toxic materials (new metal oxides, MO semiconductors, conductors, dielectrics and electrochromics free of In and Ga) associated to a low cost process multifunctional platform technology (ALL-IN-ONE TOOL) well supported by high-resolution nano-characterization techniques and fully aligned with the GREEN DEAL. With DIGISMART new and unexplored materials will be produced as well as to boost the original properties of conventional materials in order to contribute to the needs for low cost and flexible electronics. If we succeed to embed some level of intelligence in every object, this would change electronics and it would change society, ranging from embedded window displays to a wide range of biomedical electronics, just to mention a few and this is what the Internet of Things is looking for.

NOVA TALENT – ERC GRANTEE

FRANCISCO FREIRE

> **NAME PRINCIPAL INVESTIGATOR**

FRANCISCO FREIRE

> **HOSTING INSTITUTION**

CRIA (with NOVA FCSH being the Linked Third Party)

> **STARTING DATE**

1ST APRIL 2017

> **FUNDING AWARDED**

1.192.144€

> **WEBSITE**

capsahara-cria.fcsh.unl.pt



PROJECT TITLE

CRITICAL APPROACHES TO POLITICS, SOCIAL
ACTIVISM AND ISLAMIC MILITANCY IN THE
WESTERN SAHARAN REGION

PROJECT ACRONYM

CAPSAHARA

SCIENTIFIC AREAS

Anthropology
History
Political Science

BRIEF DESCRIPTION

CAPSAHARA is a European Research Council-funded project that explores social transformations in the western regions of the Sahara from the postcolonial to the contemporary period.

The project is interdisciplinary, drawing from the social sciences, including Anthropology, History, and Political Science. It foregrounds ethnographically situated analyses of the articulations of globalized processes and local knowledge and practice.

Bringing together a dynamic, international group of researchers, CAPSAHARA interrogates existing bodies of knowledge about the Sahara and explores the complex interplay between pre-colonial and colonial socio-political traditions and contemporary political expression and activism.



PROJECT HIGHLIGHTS

> **PUBLICATIONS**



5

"Looters vs. Traitors: The Muqawama ("Resistance") Narrative, and its Detractors, in Contemporary Mauritania," published in the African Studies Review in 2019 is co-authored by the PI and Mauritanian researcher Elemine Ould Mohamed Baba.

"Weapons of the weak, and of the strong: Mauritanian foreign policy and the international dimensions of social activism," published in The Journal of North African Studies in 2019.



> **NAME** PRINCIPAL INVESTIGATOR
ISABEL MERCÊS FERREIRA

> **GRANT 1** CapTherPV
HOSTING INSTITUTION
NOVA id.FCT

STARTING DATE
1ST JULY 2015

FUNDING AWARDED
1 999 375, 00€

WEBSITE
sites.fct.unl.pt/energymaterials/pages/captherpv

> **GRANT 2** CAPSEL
HOSTING INSTITUTION
NOVA id.FCT

DURATION
1ST JANUARY 2019

FUNDING AWARDED
150 000, 00€



CapTherPV

PROJECT TITLE

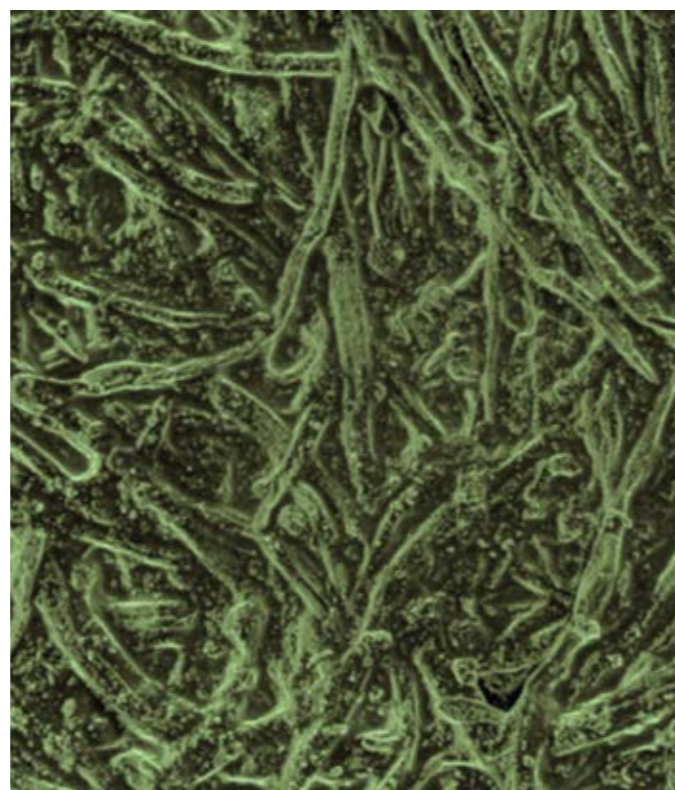
INTEGRATION OF CAPACITOR, THERMOELECTRIC AND PHOTOVOLTAIC THIN FILMS FOR EFFICIENT ENERGY CONVERSION AND STORAGE

SCIENTIFIC AREAS

Thin film thermoelectric
Solar cells and supercapacitors based on nanoparticles and graphene
Plasmonic nanoparticles synthesis and applications
Bio-Batteries and paper-batteries
Electrolytes development
3D Printing materials and methods

BRIEF DESCRIPTION

The possibility of having a unique device that converts thermal and photonics energy into electrical energy and simultaneously stores it, is something dreamed by the PI since the beginning of her research career. To achieve that goal, this project aims to gather, in a single substrate, solar cells with up-conversion nanoparticles, thermoelectrics and graphene super-capacitor, all made of thin films. These three main components will be developed separately and integrated sequentially. The innovation proposed is not limited to the integration of components, but rely in ground-breaking concepts: 1) thermoelectric elements based on thin film (TE-TF) oxides; 2) plasmonic nanoparticles for up conversion of near infrared radiation to visible emission in solar cells; 3) graphene super-capacitors; 4) integration and optimization of all components in a single CapTherPV device. This ambitious project will bring new insights at large area, low cost and flexible energy harvesting and comes from an old idea of combining energy conversion and storage that has been pursued by the PI.



PROJECT HIGHLIGHTS

> MEDIA



3

CapTherPV

3 news published in Portuguese mainstream media

8

CAPSEL

2 news published on the ERC website and 6 news published in Portuguese mainstream media

> THESIS DISSERTATIONS CapTherPV



7

> PUBLICATIONS CapTherPV



16

Ana Filipa Cristovão, David Sousa, Filipe Silvestre, Inês Ropio, Ana Gaspar, Célia Henriques, Alexandre Velhinho, Ana Catarina Baptista, Miguel Faustino, Isabel Ferreira; **Customized tracheal design using 3D printing of a polymer hydrogel: influence of UV laser cross-linking on mechanical properties.** 3D Printing in Medicine, 5, 1, 2019.

Joana Figueira, Joana Loureiro, José Marques, Catarina Bianchi, Paulo Duarte, Mikko Ruoho, Ilkka Juhani Tittonen, Isabel Ferreira; **Optimization of Cuprous Oxides Thin Films to be used as Thermoelectric Touch Detectors.** ACS Appl. Mater. Interfaces 2017, 9, 7, 6520-6529.

A. C. Baptista, I. Ropio, B. Romba, J. P. Nobre, C. Henriques, J. C. Silva, J. I. Martins, J. P. Borges, I. Ferreira; **Cellulose-based electrospun fibers functionalized with polypyrrole and polyaniline for fully organic batteries.** Journal of Materials Chemistry A, 6, 1, 2018, 256-265.

CAPSEL

PROJECT TITLE

CELLULOSE ALUMINUM POLYMER MULTI-ION COMPOSITE SOLID-ELECTROLYTE

BRIEF DESCRIPTION

A low cost and efficient cellulose aluminium polymer multi-ions solid electrolyte (CAPSEL), with ionic conductivity in the range of 1-3 mS/cm, has been produced by a simple process which enables thin and large area battery production. An electrolyte with inherent potential towards Al based batteries and posterior commercialisation. CAPSEL may represent a good alternative to Li based batteries as Al is an abundant, cheaper and less reactive metal compared to Li. The formulation of CAPSEL can be easily adapted to other ions, such as Na and Li. Furthermore, a solid electrolyte can solve many of the safety risks existing in commercially available batteries, in addition to allowing a significant reduction in their size and weight. We expect this project to give an important contribution towards a new class of highly efficiency

batteries whose disposal route offers no environmental impacts. This is only possible because of its biodegradable polymeric binder and cellulose as major constituents of the electrolyte. Therefore, CAPSEL can follow conventional recycling routes of paper after the batteries' end-life cycle. CAPSEL also enables the power supply of low-cost and large area disposable applications like e-paper, smart labels and smart packing. The Proof-of-Concept is a unique opportunity to focus on further exploitation of the developed solid electrolyte whilst at the same time concentrating efforts towards the compilation of a suitable product data sheet verified by an independent laboratory – a crucial step prior to engaging with potential investors/partners for either production or commercialisation.

NOVA TALENT – ERC GRANTEE

LUÍS PEREIRA

> **NAME PRINCIPAL INVESTIGATOR**
LUÍS MIGUEL NUNES PEREIRA

> **HOSTING INSTITUTION**
NOVA id.FCT – CENIMAT/I3N

> **STARTING DATE**
1ST SEPTEMBER 2015

> **FUNDING AWARDED**
1.429.719€

> **WEBSITE**
www.facebook.com/Naturally-Fun-105747284239698

PROJECT TITLE

NEW ERA OF PRINTED PAPER ELECTRONICS BASED ON ADVANCED FUNCTIONAL CELLULOSE

PROJECT ACRONYM

NEWFUN

SCIENTIFIC AREAS

Paper Electronics
Printed Electronics
Nanomaterials
Transistors
Nanocomposites

BRIEF DESCRIPTION

The main goal of NEWFUN project is to develop cellulose nanocomposites with specific characteristics in order to turn paper substrates not only be the physical support but also an active component in electronic devices giving a strong contribution to the development of new paper based electronic or electrochemical devices. The focus of this project is on how paper could be functionalized either by using new materials combination as well as new processes to hybridize them with cellulose. Concerning the functional materials to be used the emphasis has been on carbon and ZnO semiconductor nanostructures in order to overcome stability issues normally observed when conducting polymers are used. Some of the approaches, used in NEWFUN project, to combine them with cellulose paper are completely disruptive allowing to locally pattern functionalized areas in paper substrates. Another approach explored along the project involved the direct growth of ZnO nanostructures on discrete cellulose fibbers that can then be used to create functionalized paper sheets or to be locally combined with foreign paper substrates to create a semiconductor layer based on these cellulose nanocomposites. Finally, new cellulose-based solid electrolytes, with unique structural and optical properties, with high ionic conductivity and with improved recyclability potential were also developed where cellulose constitutes almost 100% of the electrolyte matrix.

In summary, main achievements of this project so far were:

- Synthesis of new ZnO nanostructures and oxide 2D structures
- Development of conductive lines with embedded nanocarbon in cellulose.
- Development of printable cellulose/ZnO pastes compatible with cellulose substrates
- Cellulose/ZnO composites for application in field effect transistors (FETs), able to achieve similar electrical performance to vacuum deposited ZnO layers on paper.
- Highly ionic conductive cellulose based electrolytes and its application in paper electrochemical transistors, that can also be modified to present unique optical properties such as light polarization selectivity
- Electrical (transistors, memories) and electrochemical (electrochromics, supercapacitors) devices composed of functional layer based on cellulose nanocomposites

The NEWFUN project has delivered so far important set of results impacting the field of Nanomaterials, Cellulose Composites, FETs and

PROJECT HIGHLIGHTS

> PUBLICATIONS



16

4 journal covers
Highlight paper in journal
"Flexible and Printed
Electronics" 2017
One book and two book
chapters

> PHD THESIS COMPLETED



8/1

5 best porter
presentation by PhD
students
1 best oral presentation
by PhD students

> OUTREACH ACTIVITIES



11

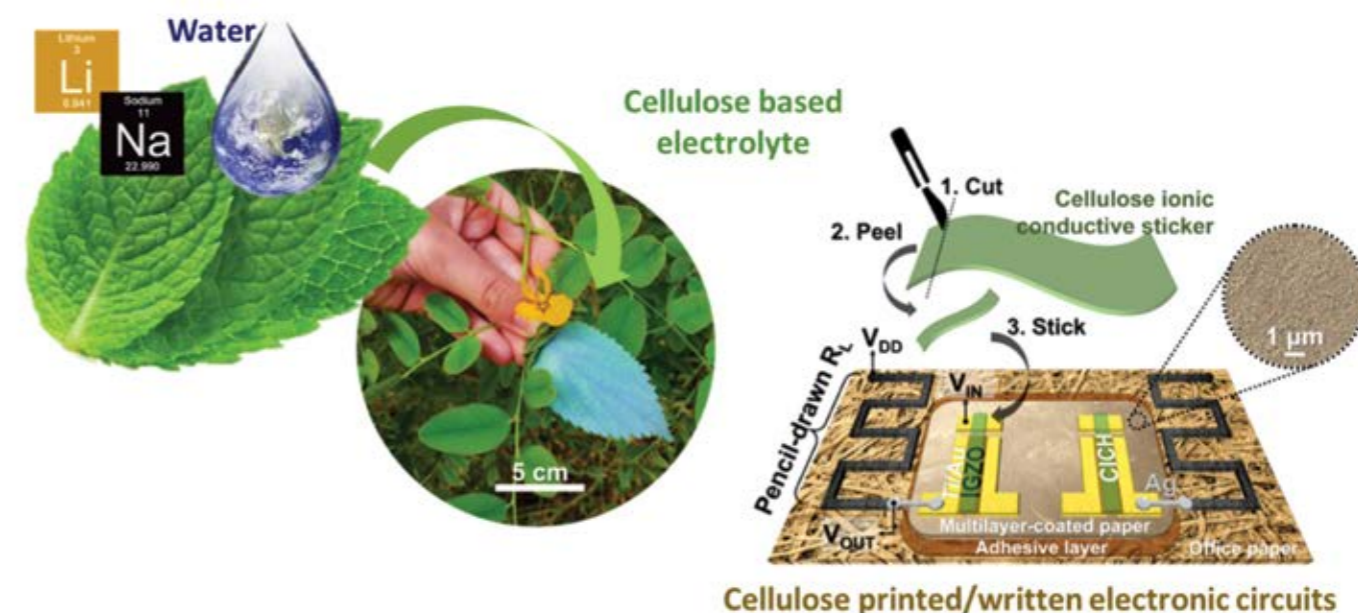
International Physics
Olympiads 2018
Ciência Viva
Finalist in HTech
entrepreneurship
program

> AWARDS



2

Prémio Inovação INCM 2016
First prize PrintoCent
InnoFest 2018



Electrochemical devices, but also on processing routes developed. The recognition of the work performed is reflected by the presence at international conferences or seminars with 42 communications (11 invited, 17 orals and 14 posters). The work developed do far resulted in 13 publications in SCI journals (other three being submitted), one book and two book chapters, all directly related with the topics mentioned above. Finally, one must highlight also the great engagement of Master and PhD students in this project, with eight PhD students and 18

Master students under the PI's supervision engaged in the last year in activities related with the project. Moreover, one important outreach action was the collaboration in International Physics Olympiads 2018. One of the practical exercises consisted in a paper logic circuit that the participating students were supposed to analyse and characterize from the electrical point of view. This was the demonstration, in front of 400 students from the entire world (and their delegations), of the potentialities of the cellulose as a platform for electronic devices.

NOVA TALENT – ERC GRANTEE
M^a DE LURDES ROSA

> **NAME PRINCIPAL INVESTIGATOR**
MARIA DE LURDES ROSA

> **HOSTING INSTITUTION**
NOVA FCSH – IEM

> **STARTING DATE**
1ST JUNE 2019

> **FUNDING AWARDED**
1.600.000€

PROJECT TITLE

ENTAILING PERPETUITY: FAMILY, POWER, IDENTITY.
THE SOCIAL AGENCY OF A CORPORATE BODY
(SOUTHERN EUROPE, 14TH-17TH CENTURIES)

PROJECT ACRONYM

VINCULUM

SCIENTIFIC AREAS

History
Archivistics

BRIEF DESCRIPTION

Few legal phenomena have been so relevant to premodern southern Europe societies as entails, a specific strategy that evolved to protect family inheritances, thus enabling the reproduction of elite social status. The VINCULUM project aims to explain how entailment became possible, how it functioned, and why it lasted for so many centuries. The project rests on the innovative theoretical claim that entails, as corporate bodies, functioned as a key social agent, created and acting within societies for which non-personal legal subjects were normal. Building on the Portuguese-Iberian case, and on the extensive research already carried out by me and my team, I propose to study 'entailment' as a diverse but pivotal practice, one embedded in law, aristocratic discourse, and kinship-based organization, and to carry out comprehensive analysis that explores this global nature. The research approach systematically breaks with traditional research frontiers: cases will extend from the 14th to 17th century in both continental and Atlantic spaces, and include both comparative perspectives and the study of later social reconfigurations.

VINCULUM will be anchored in extended research in public archives and on unprecedented access to extensive private family archives, which have been opened to research by the ARQFAM program I have led since 2008. Data collection will allow for the construction of a large database, gathering all documents relating to each entail, under a theoretical model that seeks to reconstruct past information systems, thus testing a novel methodology developed in my previous research. The database that will gather c.7000 thousand entails enabling systematic inquiries organized around the new conceptual definitions proposed by the project. The research will be strongly interdisciplinary, engaging with historical anthropology and archival science in order to construct a proper theoretical model for understanding this crucial legal and social phenomenon.

The research program engage the scientific object with an extensive survey of the documentation. This joint enterprise involves analysis on different scales and a dense critical approach. It consists of four phases 1) interrogation, analysis and description of the structure of the sources (Project 1) & documentary survey and constitution of the database of foundations and their archives (Subproject 1a); 2) thematic analyses of entailment social agency (Projects 2-4); 3) in-depth comparative analysis of the Atlantic entailment societies (Project 5); 4) interpretive synthesis of the results (Project 6).

PROJECT HIGHLIGHTS

> PUBLICATIONS



13

6 books on each internal project, the archival information system and the scientific meetings

> DATABASE



1

One extensive database (est. 40.000 entries in 3 different interconnected repositories)

> SOCIAL IMPACT



4

4 meetings in different zones of Portugal, explaining the project social impact and gathering information for research



NOVA TALENT – ERC GRANTEE

MARIANA PINHO

> NAME PRINCIPAL INVESTIGATOR

MARIANA GOMES DE PINHO

> GRANT 1 PROTEINLOCALIZATION

HOSTING INSTITUTION

ITQB NOVA

DURATION

MARCH 2013 – FEBRUARY 2018

FUNDING AWARDED

1 650 000, 00€

WEBSITE

sites.fct.unl.pt/invisible

> GRANT 2 CHRONOSANTIBIOTICS

HOSTING INSTITUTION

ITQB NOVA

DURATION

MARCH 2018 – FEBRUARY 2023

FUNDING AWARDED

2 530 000, 00€

WEBSITE

itqb.unl.pt/labs/bacterial-cell-biology

PROJECT TITLE

GRANT 1. FINDING NEW MECHANISMS FOR PROTEIN LOCALIZATION IN BACTERIA

GRANT 2. EXPLORING THE BACTERIAL CELL CYCLE TO RE-SENSITIZE ANTIBIOTIC-RESISTANT BACTERIA

SCIENTIFIC AREAS

Microbiology

Cell Biology

Staphylococcus aureus

Antibiotic resistance

Cell cycle

BRIEF DESCRIPTION

Over the next 35 years, antibiotic resistant bacteria are expected to kill more than 300 million people. The need to find alternative strategies for antimicrobial therapies remains a global challenge with several bottlenecks in the antibiotic discovery process. *Staphylococcus aureus*, is one of the most common multidrug-resistant bacteria in the European Union and also an excellent model organism for cell biology studies in cocci.

In the ERC Starting Grant we have studied the organization of the staphylococcal cell. Bacterial cells are highly organized, contrarily to what was previously thought and many proteins can only perform their role if they are correctly localized in the cell. In this work, we have used super-resolution microscopy as a major tool to study the temporal and spatial regulation of the proteins responsible for cell division and for the synthesis of the peptidoglycan. Peptidoglycan is the major structural component of the cell surface and the main inflammatory component of gram-positive bacteria.

In the ERC Consolidator Grant, we are taking advantage of the knowledge gained and the tools constructed during the first ERC to (i) find new pathways to re-sensitize resistant bacteria. Bacteria undergo major morphology changes during the cell cycle. We hypothesize that these changes generate windows of opportunity during which bacteria are more susceptible or more tolerant to the action of antibiotics. We want to identify key regulators of the cell cycle in order to manipulate the duration of windows of opportunity for the action of existing antibiotics; (ii) develop new fluorescence-based reporters for whole-cell screenings of antimicrobial compounds with new modes of action.

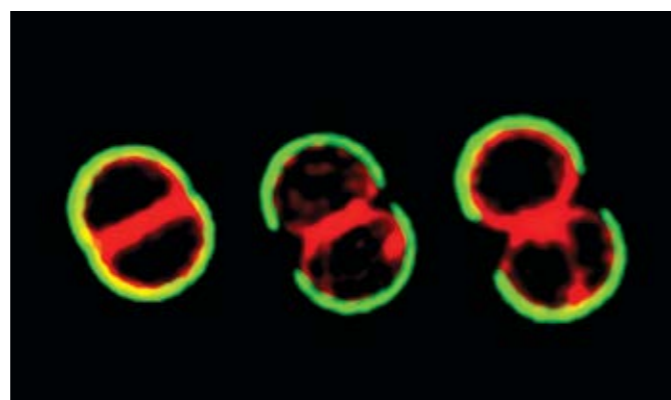


Figure 1. The cell cycle of *Staphylococcus aureus*.

PROJECT HIGHLIGHTS

> PUBLICATIONS



6

Peptidoglycan synthesis drives an FtsZ-treadmilling-independent step of cytokinesis. Monteiro JM, Pereira AR, Reichmann NT, Saraiva BM, Fernandes PB, Veiga H, Tavares AC, Santos M, Ferreira MT, Macário V, VanNieuwenhze MS, Filipe SR, **Pinho MG**. Nature. 2018; 554:528-532.

SEDS-bBPB pairs direct lateral and septal peptidoglycan synthesis in *Staphylococcus aureus*. Reichmann NT, Tavares AC, Saraiva BM, Jousselin A, Reed P, Pereira AR, Monteiro JM, VanNieuwenhze MS, Fernandes F, **Pinho MG**. Nature Microbiology. 2019; 4:1368-1377. doi: 10.1038/s41564-019-0437-2.

Cell shape dynamics during the staphylococcal cell cycle. Monteiro JM, Fernandes PB, Vaz F, Pereira AR, Tavares AC, Ferreira MT, Pereira PM, Veiga H, Kuru E, VanNieuwenhze MS, Brun YV, Filipe SR, **Pinho MG**. Nat Commun. 2015; 6:8055. doi: 10.1038/ncomms9055.

> AWARDS



1

Pfizer Award

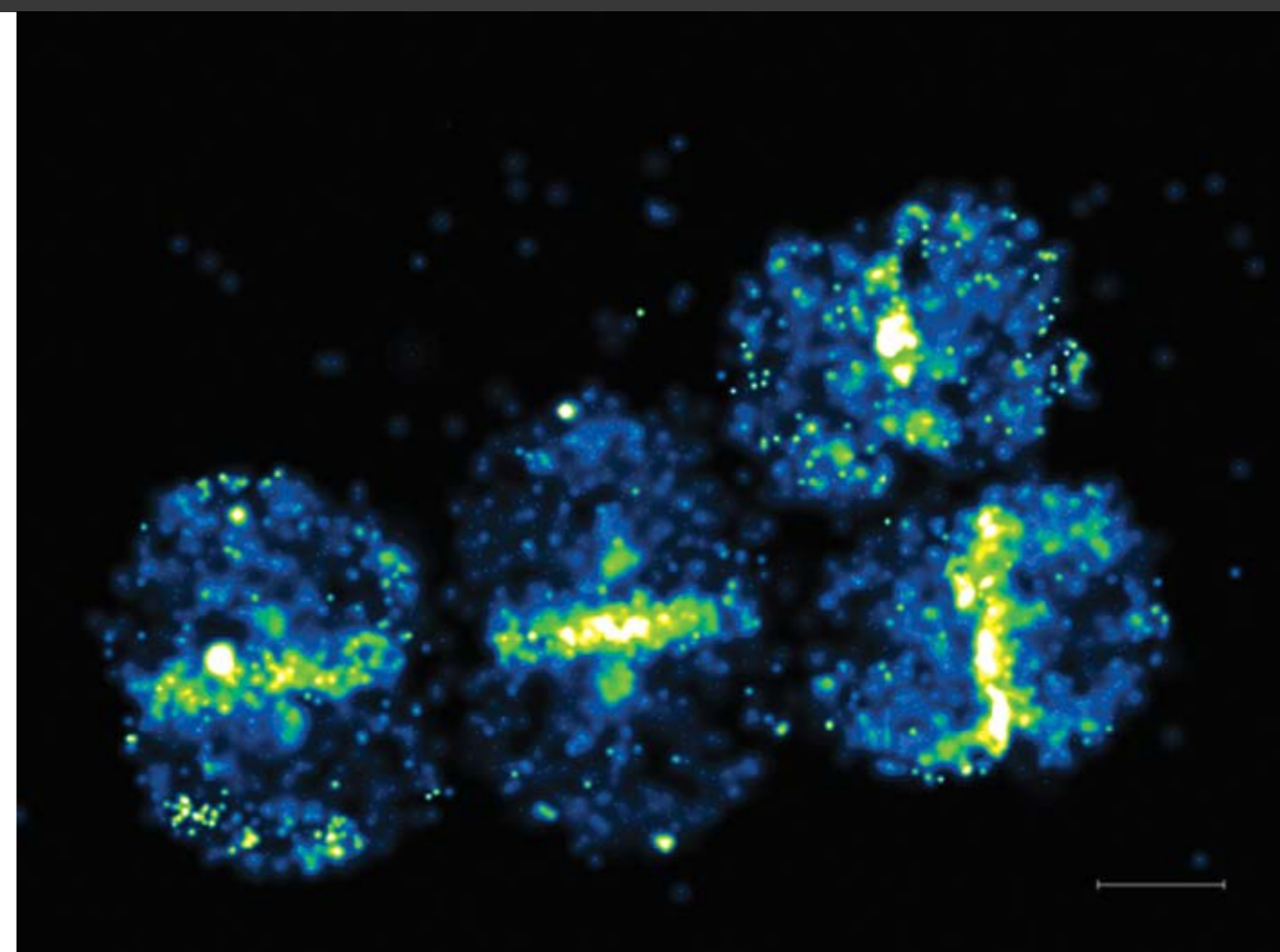


Figure 2. Single molecule detection of a protein involved in peptidoglycan synthesis.

NOVA TALENT – ERC GRANTEE
MIGUEL FERREIRA

> **NAME PRINCIPAL INVESTIGATOR**
MIGUEL FERREIRA

> **HOSTING INSTITUTION**
Nova SBE

> **STARTING DATE**
MARCH 2013 – MARCH 2018

> **FUNDING AWARDED**
1.174.000€

> **WEBSITE**
novafinance.pt/mferreira



PROJECT TITLE

UNIVERSAL BANKING, CORPORATE CONTROL AND CRISES

PROJECT ACRONYM

UNIVERSAL BANKING

SCIENTIFIC AREAS

Universal Banking
Corporate Governance
Institutional Investors
Firm Policies
Financial Crises

BRIEF DESCRIPTION

We show that financial conglomerates affect non-financial firm policies and outcomes. We conclude that bank-firm lending and governance links (through boards or equity stakes – direct or by asset management divisions) affect bank choice, loan pricing and firm valuation. Bank distress is associated with equity valuation losses and investment cuts to borrower firms with the strongest lending relationships with banks.

More broadly, we study the effects of financial globalization on corporations. Our research helps to understand the effects of institutional investors (many of them affiliated with financial conglomerates) on firm policies and the organization of the financial industry. Understanding the role that these investors play in international capital markets is crucial when there is political backlash against the benefits of financial globalization.

We show that foreign institutions play a special role by promoting long-term investment in tangible, intangible and human capital. These findings suggest that foreign institutions exert a disciplinary role on entrenched corporate insiders, as foreign institutions are more independent than domestic institutions, which may have business ties to corporate executives. Our findings highlight the importance of functional convergence (when firm-level governance responds to demands by market participants) as compared to formal convergence (when there is a change in legislation that forces the adoption of better governance).

Our study also shows how financial conglomerates operate in financial product markets. We show that an important limitation to competition is the strong presence of commercial bank-affiliated funds in many countries. Consistent with conflicts of interest among divisions of financial conglomerates, the underperformance of affiliated funds is more pronounced among funds with larger stock holdings of the bank's lending clients. Another limitation is the lack of supply of passive investment products in countries with a strong presence of financial conglomerates. We find that actively managed funds are less active and charge higher fees when they face less competitive pressure from low-cost explicitly indexed funds.

PROJECT HIGHLIGHTS

> **PUBLICATIONS**



20

Journal of Finance
Journal of Financial Economics
Review of Financial Studies

> **AWARDS**



5

Program Chair/President of
European Finance Association
Best Paper Award at China
International Conference in
Finance
S&P Dow Jones third annual
SPIVA Award

> **DISSEMINATION
TO NON-ACADEMIC
AUDIENCE**



Work referenced by regulators
(SEC, FSA, ESMA, IMF, EU) and
press (Financial Times, The
Economist, New York Times)



NOVA TALENT – ERC GRANTEE

PEDRO BARQUINHA

> **NAME PRINCIPAL INVESTIGATOR**

PEDRO MIGUEL CÂNDIDO BARQUINHA

> **HOSTING INSTITUTION**

NOVA id.FCT

> **STARTING DATE**

1ST JANUARY 2018

> **FUNDING AWARDED**

1 500 000. 00€

> **WEBSITE**

sites.fct.unl.pt/erc-trend



PROJECT TITLE

TRANSPARENT AND FLEXIBLE ELECTRONICS WITH
EMBEDDED ENERGY HARVESTING BASED ON OXIDE
NANOWIRE DEVICES

PROJECT ACRONYM

TREND

SCIENTIFIC AREAS

Oxide nanowires
Indium-free oxide semiconductors
Nanotransistors
Hybrid nanogenerators
Flexible electronic

BRIEF DESCRIPTION

The Internet of Things is shaping the evolution of information society, requiring an increasing number of objects with embedded electronics, sensors and connectivity. This spurs the need for systems assuring performance, low cost and multifunctionality. To date, there is not a technology fulfilling these needs: for instance, thin film microelectronics enables flexibility and large area processing but fails on assuring high levels of electrical performance or energy harvesting; nanoscale Si or III-V materials, while exhibiting outstanding electrical performance, typically fail on multifunctionality and/or low-temperature & large-area processing. TREND aims to take transparent electronics into as-of-yet unexplored levels of integration, by combining on flexible substrates transparent and high-speed nanocircuits with energy harvesting capabilities, based on multicomponent metal oxide materials, particularly nanowires (NWs). For this end, sustainable and recyclable materials as zinc-tin oxide (ZTO) are being synthesized using low-temperature and low-cost solution processes. The precise control of the density and alignment of these nanostructures is critical for device integration and in TREND different approaches are being considered to tackle this: transfer methods, by using techniques such as spray-coating and tuning them for reproducible deposition below and above percolation thresholds of random NW networks; direct growth of NWs from seed layers patterned by substrate conformable imprint lithography (SCIL) on flexible substrates. Major applications envisaged are nanotransistors and piezo/triboelectric nanogenerators, but other fascinating properties of these materials are also of interest for a multifunctional platform, such as photocatalytic and sensing ones. At the end a final platform of nanocircuits +nanogenerators will bring a new dimension to the systems-on-foil concept. The research is being carried out at FCT-NOVA, in a group pioneering oxide electronics.

TREND is thus an ambitious interdisciplinary project motivating advances in materials science, engineering, physics and chemistry, with impact extending from consumer electronics to health monitoring wearable devices.

PROJECT HIGHLIGHTS

> **PUBLICATIONS**



15

- Science Advances
- Advanced Electronic Materials
- ACS Applied Nanomaterials

> **AWARDS**



3

- 1 Best Poster Award
- 1 Nanotoday Jornal Cover
- 1 Science as Art @ MRS Prize

> **YOUNG-EMRS**



Creation of the Young European Materials Research Society (Y-EMRS) network (with Dr. Vassilios Binas, FORTH, Greece)

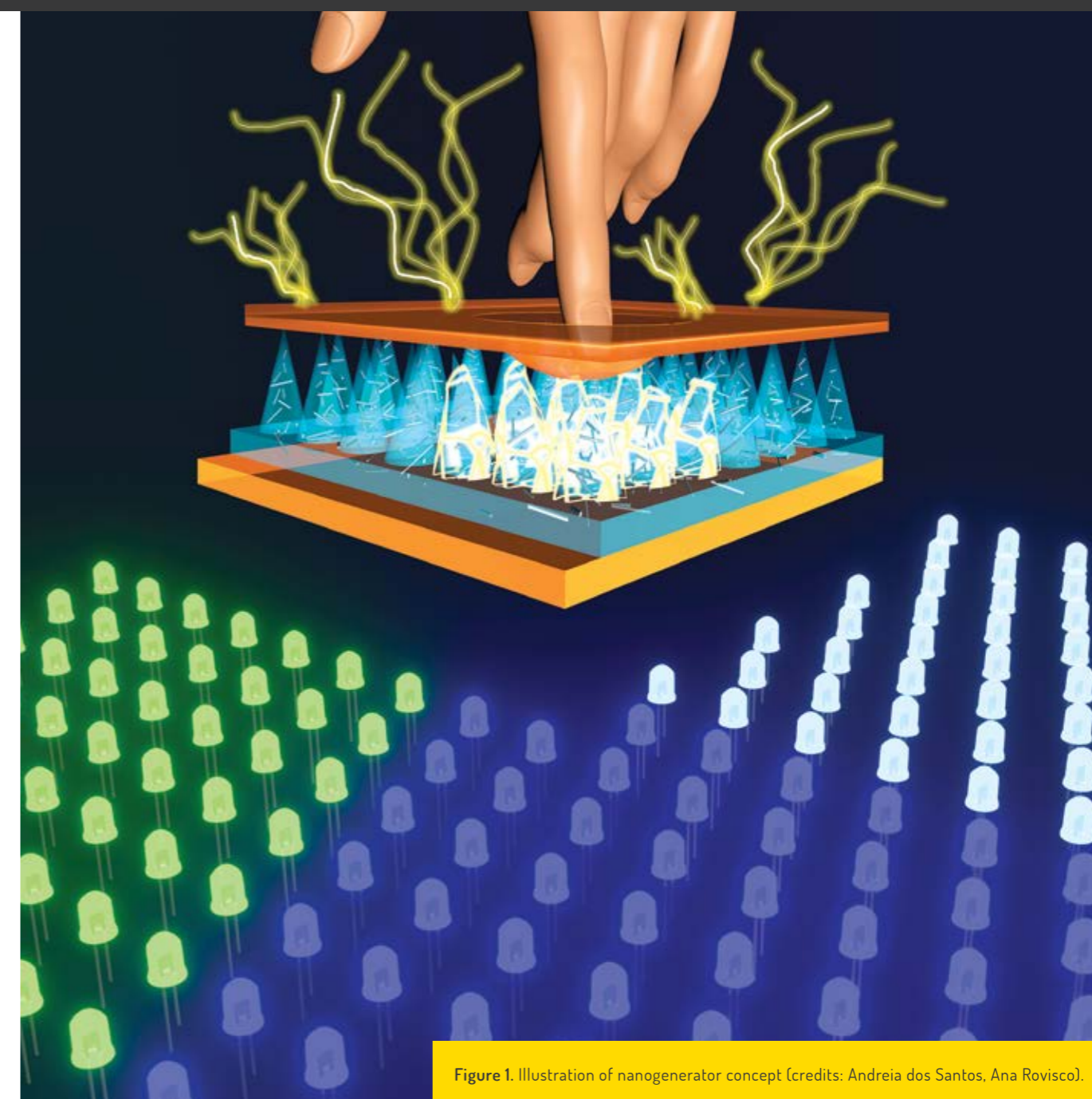


Figure 1. Illustration of nanogenerator concept (credits: Andreia dos Santos, Ana Rovisco).

10

SPEAR PROJECT

> SPEAR'S HIGHLIGHTS



Initiating institutional change in nine European Universities by implementing Gender Equality Plans



Step-by-step guidance and continuous support through Community of Learning and Community of Practice



Impartial evaluation scheme on Gender Equality Plan implementation



Learning repository shared through GenPORT



Strategic dissemination and outreach to change agents and Gender Equality initiatives



Sustaining communities of Gender Equality practitioners

WANT TO KNOW MORE?

Visit www.gender-spear.eu
Contact us myers@sdu.dk
Follow us:



NOVA TEAM

Contact Professor Elvira Fortunato



SUPPORTING AND IMPLEMENTING PLANS FOR GENDER EQUALITY IN ACADEMIA AND RESEARCH

SPEAR'S OBJECTIVES

Building on the European Research Area's central Gender Equality (GE) objectives, SPEAR operates with four overall objectives:

- Increasing the number of Research Performing Organizations (RPOs) with implemented Gender Equality Plans (GEPs)
- Removing barriers and improving career prospects for women in academia
- Strengthening the gender dimension in research content
- Improving the balance in decision-making bodies

SPEAR'S APPROACH

We focus on **support, learning, practice, collaboration and sustainability**. That is why, for adequate GEP implementation we apply a systematic approach, deep knowledge and support structures.

SPEAR covers **practice and processes**, i.e. the underlying structures, procedures, activities and working conditions. This means that the project does not employ a fix-the-women approach nor does it merely focus on changing the numbers of women in research.

It is imperative that SPEAR partners develop an understanding of what gender equality means in all our respective national and institutional cultures, to help each other conceive strategies that play into national tastes and counter culturally-specific obstacles.

Structured, joint reflection is central in our efforts to implement effective gender measures in order to address the persistent gender inequality in the nine SPEAR universities.

SPEAR'S DESIGN

Supporting GE practitioners in GEP implementation.

The SPEAR consortium consists of nine RPOs: three **Supporting Implementing Partners (SIPs)** with some experience in GE and GEP implementation, and six **Implementing Partners (IPs)** with little or no such experience.

The three SIPs are based in three different EU countries reported to perform strongly (Germany and Sweden) or making considerable progress (Denmark) in terms of implementing GEPs in RPOs. The six IPs are based in EU member states with little or low reported performance in this aspect (Lithuania, Bulgaria, Portugal, Croatia).

The nine S/IPs are organized into three Learning and Support Clusters (LSCs). LSCs aid the exchange and support between differing levels of GE-and GEP-experience vital to SPEAR.

Collaboration through Communities: Community of Learning (CoL) and Community of Practice (CoP)

For effective work on GEPs, SPEAR established two Communities. **They are interdependent and will ensure a strong collaborating network.**

SPEAR partners navigate in a "glocal" collaboration, where institutional gender equality progress is simultaneously part of the larger international movement toward gender equality (e.g. included in the United Nations' Sustainable Development Goals), yet is informed and conceived by local, national and organizational contexts. All partners possess deep knowledge of what is possible or impossible to achieve in their own cultures and organizations.

PRACTICAL IMPLEMENTATION

SPEAR evolves around **PLSMs (Project Learning and Support Meetings)**, where we ensure structured joint reflections in our Communities. Representatives from all partner universities meet in person at PLSMs, and subgroups meet additionally in person a few times during the project, at site visits in our LCSs.

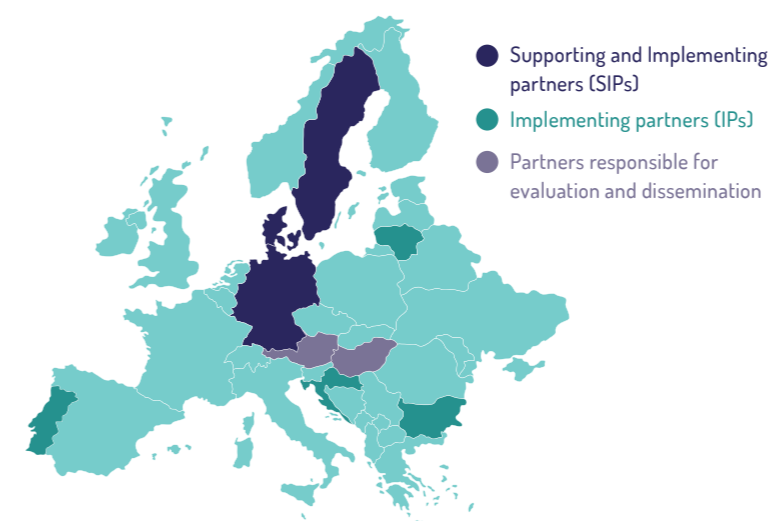
In-between these in-vivo meetings, we meet in different groupings via online meeting platforms. In SPEAR we aim to take an explicit and deliberate stance in working on GEPs with and across differences and diversity – through planned discussions, through joint and individual reflection and through diligent exploration whenever cues of divergence occur.

SUSTAINABILITY

The CoL and CoP provide consortium members with vital experience in how to sustain communities of GE practitioners, an aspect that will be upscaled and exploited through **SPEAR's commitment to foster and fortify GE communities and networks across the EU.**

SPEAR's consortium has already engaged widely in GE networks across Europe and instigated the establishment of several such networks themselves. This provides valuable experience in SPEAR's future community commitment. SPEAR integrates other collaborative efforts as it engages stakeholders from EU-funded GE projects in, and from sectors beyond, academia.

In our wider national and regional networks, we seek to inspire and develop effective ways of moving our organizations – and indeed the wider European academic sector – in positive directions in terms of ensuring gender equality both in the universities as workplaces, in decision making and in research output.



This project has received funding from the European Union's H2020 Research and Innovation Programme under Grant Agreement No 824544

> SPEAR'S COMMUNITIES OF LEARNING (CoL)



Create a learning and training environment that is guided by all project partners



Collect information about measures and possible obstacles



Ensure that all members get the information and input that they need to turn their findings into actions at home



Accumulate good practice examples accessible for all members

> SPEAR'S COMMUNITIES OF PRACTICE (CoP)



Provide a space for reflection and feedback on the actions, experiences and challenges resulting from CoLs



Assure the exchange between all members on equal terms



Create lasting practice and knowledge for all participants

The activities and interactions of the CoL and CoP will be further enhanced by the learnings from SPEAR's integrated impartial evaluation feedback.

> SPEAR IS ORGANIZED AROUND 7 WORK PACKAGES

- WP1 Management
- WP2 Dissemination & Communication
- WP3 Evaluation
- WP4 Implementing Gender Equality Plans
- WP5 Supporting Implementation of GEPs
- WP6 Mainstreaming & Sustainability
- WP7 Ethics requirements

11

INTERVIEWS

SIR PAUL NURSE

DIRECTOR OF THE FRANCIS
CRICK INSTITUTE LONDON

P. 98



JEAN-PIERRE BOURGUIGNON

ERC PRESIDENT, 2014 - 2019

P. 100



CARLOS MOEDAS

EU COMMISSIONER FOR RESEARCH,
SCIENCE & INNOVATION, 2014 - 2019

P. 102



SIR PAUL NURSE

INTERVIEW

Jornal Expresso

Autor: Virgílio Azevedo

Fotografia: Tiago Miranda

Sir Paul Maxime Nurse (born 25 January 1949), is an English geneticist, former President of the Royal Society and Chief Executive and Director of the Francis Crick Institute. He was awarded the 2001 Nobel Prize in Physiology or Medicine along with Leland Hartwell and Tim Hunt for their discoveries of protein molecules that control the division of cells in the cell cycle.

11 INTERVIEWS

SIR PAUL NURSE

“ Um bom acordo para a ciência britânica é não haver ‘Brexit’

Dirige o Francis Crick Institute em Londres, o maior centro de investigação de ciências biomédicas da Europa, e foi Nobel da Medicina em 2001 pela descoberta das proteínas que controlam a multiplicação das células. Paul Nurse, que participou recentemente numa conferência no Dia da Universidade NOVA de Lisboa, pertence ao Grupo de Alto Nível de Aconselhamento Científico da Comissão Europeia, que integra sete investigadores de topo, incluindo a portuguesa Elvira Fortunato. E diz que vai continuar neste grupo depois do ‘Brexit’, porque está por mérito próprio e não a representar o seu país. Nurse considera que “o ‘Brexit’ terá um impacto negativo muito maior na ciência britânica do que na ciência europeia”.

● Na ciência, o Reino Unido contribui com mil milhões de euros para o orçamento anual da UE mas recebe €1,5 mil milhões. Com o ‘Brexit’, o que seria um bom acordo com Bruxelas na investigação científica?

● Um bom acordo para a ciência britânica é não haver ‘Brexit’. É tão simples como isto.

● Em julho disse à revista “Nature” que o Reino Unido estava a caminhar para um desastre. Depois dos acordos conseguidos por Boris Johnson com o Parlamento e com a UE mantém a mesma posição?

● Nessa altura estava a referir-me a um ‘Brexit’ sem acordo com a UE, o que levaria o Reino Unido a ser excluído da maioria dos mecanismos científicos de cooperação europeia. Mas se tivermos um ‘Brexit’ negociado pelo primeiro-ministro, a situação será com certeza mais tolerável. Só que de momento não temos um acordo que seja ideal para a ciência britânica. Boris Johnson parece querer evitar um alinhamento com a UE em termos de regulamentos, o que é um problema para conduzir e aplicar a investigação científica no Reino Unido. Por outro lado, os líderes do Partido Conservador não têm capacidade política suficiente para se relacionarem com os seus colegas europeus. E sem uma boa relação é difícil alcançar compromissos e estabelecer formas de trabalhar.

● Será então um acordo frágil na ciência?

● Não vai ser politicamente fácil para o Reino Unido negociar uma boa posição, porque a falta de regulamentação vai tornar as coisas difíceis. Se não estivermos no mesmo mercado comum, não estou a ver como é que os nossos projetos científicos podem ser elegíveis a fundos europeus. Em todo o caso, este é um problema a curto e médio prazo, porque na realidade penso que vamos gradualmente voltar a ser membros da UE. Mas talvez isso não aconteça durante a minha vida...



● Um estudo da Royal Society mostra que, desde o referendo de 2016, o peso anual do Reino Unido no financiamento da ciência da UE caiu 33%. E o número de cientistas estrangeiros que vão trabalhar no país ao abrigo de programas europeus desceu 35%. Está preocupado com estes dados?

● Claro que estou. É imprevisível se a ciência do Reino Unido se consegue manter nas fortes redes de cooperação europeia construídas ao longo de mais de 40 anos e ter acesso a financiamento de elevada qualidade das instituições da UE. Não vejo qualquer vantagem do ‘Brexit’ para a ciência britânica.

● O mesmo estudo revela que a ciência britânica perdeu financiamentos de €500 milhões por ano desde 2016 por causa da instabilidade do ‘Brexit’. E que a parte do Reino Unido no financiamento do programa europeu Horizonte 2020 de apoio à ciência passou de 16% para 11%. Esta tendência negativa vai continuar?

● Se sairmos da UE a economia vai ser afetada. E quando isso acontece, a investigação científica fundamental e mesmo a investigação aplicada são também afetadas, porque as prioridades do financiamento público vão para a saúde, a educação e outros serviços do Estado, e não para a ciência. O Governo sublinha que quer apoiar a ciência, mas o primeiro-ministro Boris Johnson não é muito credível no que diz e muda constantemente de posição, portanto não podemos confiar em tudo o que ele afirma. Por outro lado, com a economia a cair deixamos de ter acesso a fundos europeus importantes como as bolsas milionárias do Conselho Europeu de Investigação (ERC).

● Quanto investe o Reino Unido por ano em investigação?

● Estamos entre os países da UE que menos gastam em ciência, cerca de 1,7% do PIB, enquanto países como a Alemanha já estão perto dos 3%. Além disso, o ‘Brexit’ tem um impacto negativo significativo na imagem do Reino Unido, não apenas na Europa, mas também em todo o mundo. Fecharmos o país

sobre si mesmo não é compatível com fazer ciência de elevada qualidade, movimentar pessoas, ideias e recursos com outros países.

● A reputação científica do Reino Unido será afetada.

● Penso que vai diminuir. Dirijo um grande instituto de investigação nas ciências biomédicas, o Francis Crick Institute, e ainda não sentimos nenhuma mudança, mas outras instituições do Reino Unido já estão a sentir. No Crick Institute temos tomado medidas para nos protegermos e mantermos uma forte rede de contactos e de interações com o resto da Europa.

BB

Boris Johnson não é muito credível no que diz sobre a ciência e muda constantemente de posição.

● O impacto negativo do ‘Brexit’ na ciência não é, assim, apenas um problema de financiamento.

● Não. É também um problema de reputação, cultura, permeabilidade, redes de trabalho com a UE e com o resto do mundo.

● Boris Johnson deu instruções em setembro a vários departamentos do Governo para criarem um novo sistema de vistos rápidos para atrair cientistas de topo para o Reino Unido. É uma medida positiva?

● Temos um sistema burocrático nesta área que é mau há vários anos, estamos sempre preocupados e nunca foi melhorado. Eu diria que são boas notícias, mas a minha reserva é que nem sempre acredito no que é dito pelo Governo, porque há a tendência para se anunciar aquilo que soa bem.

■ ■ ■ vazevedo@expresso.impresa.pt

PROF. JEAN-PIERRE BOURGUIGNON

INTERVIEW

NOVA Communication Office
Fotografia: ERC- European
Research Council

Jean-Pierre Bourguignon (born 21 July 1947) is a French mathematician, working in the field of differential geometry. He was president of the Société Mathématique de France from 1990 to 1992. From 1995 to 1998, he was president of the European Mathematical Society. He was director of the Institut des Hautes Études Scientifiques near Paris from 1994 to 2013. Between 1 January 2014 and 31 December 2019, he was the President of the European Research Council.

11 INTERVIEWS JEAN-PIERRE BOURGUIGNON

● What is the most important outcome of this last ERC call?

● The last ERC call, whose results have been released just a week ago, is the 2019 Consolidator Grant call, i.e. one that concerns researchers seven to 12 years after their PhD, hence still at the beginning of their careers. Thanks to a slightly higher budget, the success rate at this call has reached 13.1% – the highest in this category since the ERC was created. It is to be noted that, according to a gender balance policy set by the ERC Scientific Council some years ago, the upper limit of 12 years is shifted by 18 months per child for women upon presentation of the birth certificate and for men by an explicit proof of the leave of absence they took. This call actually confirms the continuing strong performance of a certain number of countries in the competition, in particular the Netherlands with 43 grants, representing almost 14% of all grants given, whilst its population represents just a little more than 3% of the EU population. Another confirmation from this call is that the share of grants going to women is above 30%, i.e. ahead of the proportion of women researchers in this age group. The ERC has however never changed its sole selection criterion, which remains and will remain scientific quality.

● Moreover, what about Portugal?

● In the latest grant competition, there were forty applications from researchers with a host institution in Portugal. Four were successful, hence a 10% success rate, and three ranked among the “unfunded As”, meaning that they had an excellent evaluation throughout but that there was not enough money to back them. For the ERC, annually having about 500 such applications that remain unfunded by lack of budget is a strong argument for an increase of the ERC budget in Horizon Europe, the next EU framework programme for research and innovation. It is also a strong argument for getting national structures to recognise the high-level of performance of these applicants in terms of quality by providing them with adequate support without further scrutiny.

● How do you look at European research?

● Research in Europe continues to perform well overall – our continent hosts so much scientific creativity and succeeds in being present in many areas. But we face stiff competition from around the world. With the creation of the ERC, Europe has redoubled its effort by funding top researchers and their blue sky research. It has even led to that Europe, in 2014, for the first time overtook the USA in terms of scientific impact if measured by publications in the top 1% most cited international peer reviewed scientific publications. So there are positive signs.

The research landscape shows a number of high performing countries and institutions. It is very diversified as the organisation varies a lot from one country to the next: universities are the big players in some countries,



The biggest challenges for Europe are to remain competitive at a world level and to motivate the most talented young people to engage in research in Europe

whilst in others research institutions play a significant role. The contribution of the European Union framework programme Horizon 2020, that addresses both research and innovation, amounts to only 8% of the EU budget and also 8% of the overall (public and private) investment in research in Europe. It has a considerable added value as it helps to establish some standards in terms of evaluation, which the European Research Council contributes to, and facilitates mobility as the Marie-Sklodowska-Curie does. The key issue it faces is the insufficient support given at national level in too many countries. The goal of 3% of GDP expenditures for the overall support to research in 2020 will be achieved only by a minority of countries, all of them concentrated in the more northern parts of Europe. Probably even more important is the lack of career prospects for many young researchers, which leads some of them to leave Europe to pursue their dreams elsewhere or to leave research altogether.

● Although we are a small country, there are more than 100 Portuguese researchers awarded. What is your opinion about that?

● Between the seventh EU framework programme and Horizon 2020, Portugal has improved its success rate in ERC calls by 3.3%, ranking seventh amongst the Member States that have seen such an increase. During my visit to NOVA

University I heard Minister Manuel Heitor announce that now Portugal has been able to receive more competitive subsidies from Horizon 2020 than from its contribution to the budget, showing the very significant improvement in the capacity of the country to win scientific support.

● What are the biggest challenges European researchers and universities face nowadays?

● For me, the biggest challenges for Europe are to remain competitive at a world level while a number of countries around us progress considerably due to sustained investment, and to motivate the most talented young people to engage in research in Europe. To enable this future, they must see adequate perspectives to develop their projects in a supportive environment. This means having of course enough financial and long-term resources at their disposal but also the freedom to work on topics of their choice for a good part of their work. It is very important that enough support remains for bottom-up research both at European and national levels, meaning that the temptation by governments to tell researchers what they should be doing is sufficiently contained. This will require a better understanding of how researchers can best contribute to solving the important challenges European societies face on a number of fronts.

■ NOVA Communication Office

CARLOS MOEDAS

INTERVIEW

NOVA Communication Office
Fotografia: European Commission

Carlos Moedas (born 10 August 1970) is a Portuguese civil engineer, economist and politician. From 2014 until 2019, Moedas served as European Commissioner covering the portfolio of Research, Science and Innovation under the leadership of President Jean-Claude Juncker. He designed the proposal for the future Horizon Europe programme worth 100 billion euros, set to be launched in 2021. Between 2011 and 2014, he served as Under-Secretary of State in the XIX Constitutional Government of Portugal.

11 INTERVIEWS

COMMISSIONER CARLOS MOEDAS

● With Horizon 2020 ending, what is your assessment of the impact the European Commission has had on national research and innovation projects, particularly at university level?

● Several independent reviews have been done since Horizon 2020 started and all of them pointed out to added-value of the programme.

Although it counts only for 8-10% of the total investments in R&I in Europe, those evaluation estimate that more than 80% of European R&I projects would not have gone ahead without EU funding.

The impact on European universities is very substantial. Higher education institutions are by far the first category of beneficiaries of the EU programme, with about 40% of its total budget. But it's not just a matter of funding. The impact of the programme on universities is also very important in terms of fostering the scientific international cooperation. EU funding has allowed teams across countries and scientific disciplines to work together and make unthinkable discoveries, making Europe a world-class leader in research and innovation.

● What is your perception about what Portugal is developing in the areas of research and innovation?

● Being EU Commissioner for Research, Science and Innovation, I had the privilege of spending 5 years visiting the country and engaging with the Portuguese research and innovation community. I visited almost all the universities and research centers of the country, from North to South, including our islands, because it was important for me to know the reality on the ground. I felt the need to meet and discuss directly with the academia, researchers, entrepreneurs, innovators as well as with the political national and regional entities.

From all those visits to Portugal, I brought with me so many examples of excellence. I always remained very impressed and optimistic about the skills and capacity of the country in terms of science and innovation. I visited all the other European countries and I can tell you that Portugal has many reasons to be proud of.

● What is Europe's perception of Portugal and its universities in terms of innovation and research?

● Portugal is perfectly among the average of its EU partners in terms of performance, being slightly above in terms of success rate (13%).

On universities in particular, it's important to note that only 26% of the Horizon 2020 funding granted to Portugal has been allocated to universities and higher education system while the research organizations are receiving 37% and 29% for private organisations.

I believe that some improvements are still achievable regarding the cooperation between universities and industry, being big companies or start-ups. Such cooperation is a win-win situation for both sides when they work together on R&D projects.

BB

Horizon 2020 is one of Europe's biggest success stories.



● Do you think the major challenge for universities is their connection to the business sector and the communities in which they operate?

● Although I have seen great examples of projects involving Portuguese universities and industry, I recognize that such cooperation is still too limited. I understand that both sides are traditionally used to work alone, one close to the fundamental research and the other close to the market. But nowadays such silos are outdated. Tackling important societal challenges can only be done effectively by addressing all the value chain, from the labs to the market.

This is why the programme Horizon 2020 is promoting such kind of collaborative projects.

● How do you see the next Framework Program?

● Horizon 2020 is one of Europe's biggest success stories. So, my level of ambition for the new Horizon Europe programme could only be higher, namely on the budget to fund the research and innovation in Europe that has been proposed at €100 Bn.

But I never intended to make a revolution out of Horizon Europe compared to the current programme. I believe that some stability is important for our participants and we should refrain of changing rules just for the sake of it.

Building on the achievements and success of the current programme, Horizon Europe continues to drive scientific excellence through the European Research Council (ERC) and the Marie Skłodowska-Curie fellowships (MSCA) and exchanges, strengthening the EU's global scientific leadership.

We are also proposing a new European Innovation Council (EIC) to modernise funding for ground-breaking innovation to help the EU become a frontrunner in market-creating innovation. This «one-stop shop» will bring the most promising high potential and breakthrough technologies from lab to market application, and help the most innovative start-ups and companies scale up their ideas. The new EIC will help identify and fund fast-moving, high-risk innovations with strong potential to create entirely new markets. It will provide direct support to innovators through two main funding instruments, one for early stages and the other for development and market deployment. It will complement the European Institute of Innovation and Technology (EIT).

Finally, a last word on the other big change that Horizon Europe is introducing: the missions. With bold and ambitious goals, the missions aimed to reengage citizens to science and showing how strong is the European added-value in tackling challenges that affect our daily lives. Examples could range from the fight against cancer, to clean transport or plastic-free oceans.

● Moreover, how can Portugal and Portuguese universities make good use of it?

● I'm very optimist because the recent trend has been very positive. By the end of Horizon 2020, Portugal should have received close to €1 Bn, which means basically doubling the amount compared to the previous programme FP7.

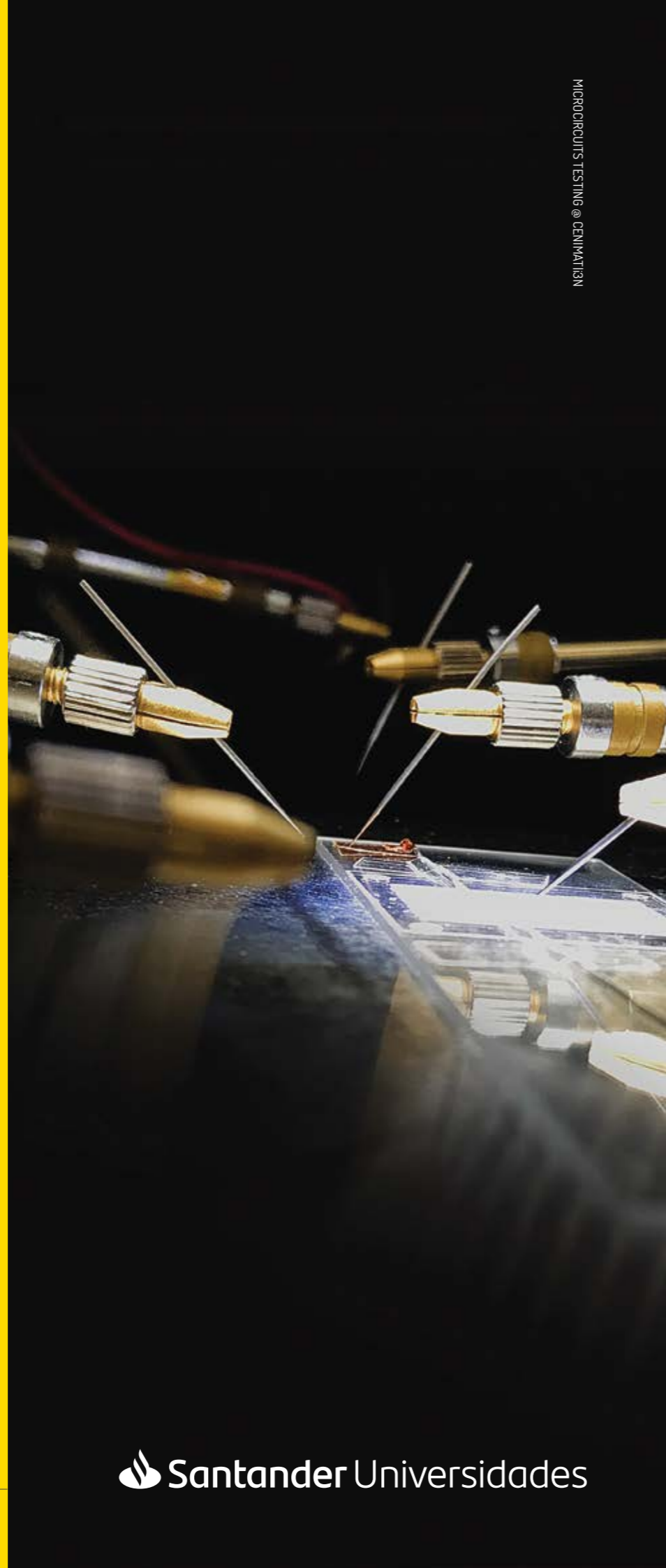
I have a natural expectation that in the Horizon Europe, the Portuguese performance will keep this positive trend.

■ NOVA Communication Office

12

COLLABORATIVE RESEARCH AWARD SANTANDER/ NOVA

MICROCIRCUITS TESTING @ CENIMAT/3N



12

SANTANDER/NOVA COLLABORATIVE RESEARCH AWARD

For more than a decade, NOVA University Lisbon and Banco Santander have been awarding the Santander/NOVA Collaborative Research Award, which distinguishes research projects developed by young researchers at NOVA, involving at least two different academic units of the University.

The prize is awarded annually, on a rotating basis, either in the areas of Life Sciences, Exact Sciences and Engineering or Social Sciences and Humanities.

The winner of the 12th edition of the Santander/NOVA Collaborative Research Award 2018/2019 in the area of Exact Sciences and Engineering was the project "PlaTiNa - Low cost platforms based on Nano-heterostructures of TiO₂/WO₃ to apply in Photocatalysis". The winning team was formed by **Ana Pimentel**, from CENIMAT/3N, NOVA School of Science and Technology, in collaboration with **Vanessa Jorge Pereira**, from ITQB NOVA/ iBET.

This project explores how we can fight the presence

of pharmaceuticals and pesticides in wastewater and groundwater, as well as in drinking water, indicated by the European Union as priority treatment pollutants due to its high toxicity. The main concerns are analgesics, antibiotics and antiepileptic drugs, which have proven to be resistant to wastewater treatments.

According to Ana Pimentel, "the goal is to perceive the efficiency of these treatments in the removal of chemical pollutants, for example, antibiotics, because even when present in water at very low concentrations they can contribute to the emergence of resistances". As the researcher Vanessa Jorge Pereira recalls, "in the world, right now, there are 800 million people who do not yet have a safe water supply, hence the importance of this collaborative research that will allow testing materials already normally used, now in new water pollutants."

The award was delivered by the Rector of NOVA, **João Sâágua**, and the Chairman of Banco Santander Portugal, **António Vieira Monteiro**, during the NOVA Science Day 2019. ■■

13

NOVA SCIENCE DAY 2019

13

NOVA SCIENCE DAY 2019

THE TALENT OF NOVA

In September 2019, NOVA hosted the second edition of the **NOVA Science Day**. This year the event was dedicated to the talent of NOVA.

The Rector of NOVA, Professor João Sàágua, opened the event with a speech that celebrated the researchers of the university:

“

The consistent efforts and excellence of our talented researchers have turned NOVA into a research-oriented university and, most importantly, a university that combines fundamental research with collaborative agendas tackling real problems and challenges posed by society, its institutions, and the sustainable development goals.

The keynote speeches were delivered by the Minister of Science, Technology and Higher Education, Professor Manuel Heitor, and the President of the European Research Council, Professor Jean-Pierre Bourguignon, who stressed the importance of interdisciplinarity in science.

Doctoral students had the opportunity to present and share their work in a poster session.

The talent of NOVA continued to be showcased throughout the afternoon with presentations by some of the researchers with ERC grants. All of the nineteen ERC grantees of NOVA were honoured later in the event.

Professor Elvira Fortunato closed the day highlighting the objective of this initiative, which “**aims to promote interdisciplinarity as a first step towards boosting creativity and innovation.**”

The NOVA Vice-Rector for Research also stressed the importance of the ERC programme, the best research funding instrument in the world since it supports all fields of science in the basis of scientific excellence, and reinforced that “**this year we have celebrated the talent of NOVA, and especially we would like to acknowledge the extraordinary and excellent work of our ERC grantees. We are very proud of your achievements!**” ■ ■



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O **PRÉMIO IN3+** VISA SELECIONAR E VALORIZAR AS **IDEIAS E AS SOLUÇÕES MAIS INOVADORAS**, ATRAVÉS DO FINANCIAMENTO DE **1.000.000 €** PARA OS PROJECTOS REFERENTES ÀS IDEIAS VENCEDORAS.

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TECNOLOGIAS DE INFORMAÇÃO E COMUNICAÇÃO

Novos sistemas operativos, processamento, armazenamento e transmissão de dados e respetivo software e aplicações móveis por via da transformação digital.

NOVOS PRODUTOS E SERVIÇOS

Introdução de novos conceitos, funcionalidades, tecnologias ou uma nova combinação entre novo conhecimento e tecnologia já existente, transformando o estado de arte atual da indústria e do conhecimento.

OTIMIZAÇÃO E MELHORIA DE PROCESSOS PRODUTIVOS

Novas ideias relacionadas com pelo menos uma das seguintes áreas:

- a) Novas tecnologias ou novos materiais;
- b) Sistemas de produção flexíveis, reconfiguráveis, inteligentes, adaptativos, colaborativos em rede e para customização em massa;
- c) Eficiência energética e minimização dos impactos ambientais.

NOVOS MODELOS DE NEGÓCIO E COMUNICAÇÃO DIGITAIS

Novas abordagens e soluções relacionadas com a incorporação de novas tecnologias conducentes à digitalização do negócio e criação de novos modelos e plataformas de negócio.



Investing in research and development means bringing the future closer. At The Navigator Company, R&D is entrusted to RAIZ, the Company institute devoted to developing know-how and have involved building cooperation between industry and academe.

A series of initiatives were approved in 2017 for research on a networking basis, rewarding the expectations of researchers and technical staff who will now benefit from closer ties between RAIZ and Portuguese universities and other organisations in the national and international scientific and technological systems.

The funding application for the Inpactus project was approved towards the end of the year and the news was greeted with excitement by RAIZ and its partners in current projects.

The new project is promoted by Navigator and RAIZ, and involves cooperation over four years with a long list of partners, including the Universities of Coimbra, Aveiro, Beira Interior and Minho, NOVA University Lisbon, Instituto Superior Técnico, Fraunhofer Institute (Germa-ny), RISE (Sweden) and the Iberian Internal Nanotechnology Laboratory (Braga). Research will be conducted on a range of fronts, all with a view to creating innovative and distinctive products from eucalyptus fibre, in pulp and printing and writing paper, as well as in tissue and new bioproducts obtained from biomass and wood.

The research process has already yielded a number of advances, in particular in production of pulp with superior mechanical strength and better environmental performance, production of tissue with a high eucalyptus fibre content, production of paper with improved printability and new functional coatings, promotion of bioactive and nutraceutical products, as well as biofuels and biocomposites from biomass.

The programme will also highlight the added value offered by biomass and wood, through biorefineries, the fourth main focus area, accounting for 50% of the funding. This will look into producing

'families' of products based on wood and biomass, geared to environmental sustainability, a challenge for which Navigator's pulp and paper mills are well positioned.

The Forest and Paper Research Institute engages in research aiming to ensure successful forestry operations, for instance by developing scientific knowledge applied to genetic improvement of eucalyptus and equipping the Company with the tools to combat forest pests. RAIZ also provides crucial support for industrial operations, as a technological consultant helping to improve production processes for pulp and paper. In keeping with its concern for effective use of resources, it also contributes to the excellent environmental performance achieved by the Company's plants.

RAIZ is also engaged in developing forest inventory tools. The Navigator Company's forest holdings represent only a fraction of Portugal's woodlands, and it is therefore crucial that resources be more widely applied and know-how transferred to other forest landowners, enabling them to manage their holdings to their best advantage. Complementing this, the institute is concerned to share good forestry practices with others interested in these issues, seeking to expand its own knowledge in these areas.

Other important aspects of RAIZ' work have been its ongoing support for the process of implementing the Company's forestry project in Mozambique, which has faced specific challenges related to the geographical location, and the search for suitable land in Spain.

In response to the new dynamic created by the Inpactus project and the need to reequip the institute for the research work involved, the institute's buildings, at Quinta de São Francisco, Eixo, in the municipality of Aveiro, have been renovated and refitted, for the first time in three decades. The estate is open to visitors, who come to see the collection of eucalyptus and other trees, many of them over a hundred years old, as well as the wealth of wildlife.

NOVA SCIENCE 2019

Ana Ruvisco@CENIMAT



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